US007377347B2

(12) **United States Patent**
Rasidescu et al.

(10) **Patent No.: US 7,377,347 B2**
(45) **Date of Patent: May 27, 2008**

(54) **THREE-SEAT SNOWMOBILE WITH MODULAR SEAT**

(75) Inventors: **Mihai Rasidescu**, Sherbrooke (CA); **Steve Langlais**, Orford (CA); **Yvon Bédard**, Orford (CA)

(73) Assignee: **Bombardier Recreational Products Inc.**, Valcourt (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 266 days.

(21) Appl. No.: **11/212,754**

(22) Filed: **Aug. 29, 2005**

(65) **Prior Publication Data**

US 2006/0042847 A1 Mar. 2, 2006

Related U.S. Application Data

(63) Continuation-in-part of application No. 11/040,112, filed on Jan. 24, 2005, now abandoned, which is a continuation of application No. 10/851,476, filed on May 22, 2004, now abandoned.

(60) Provisional application No. 60/472,733, filed on May 23, 2003, provisional application No. 60/654,383, filed on Feb. 18, 2005.

(51) **Int. Cl.**
B62D 55/07 (2006.01)

(52) **U.S. Cl.** **180/190**; 297/215.12

(58) **Field of Classification Search** 180/182, 180/190; 297/215.12; 197/195.1, 195.11, 197/195.12, 195.13
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,736,020	A *	5/1973	Pilachowski et al.	296/63
4,679,647	A *	7/1987	Komuro	180/219
4,779,695	A *	10/1988	Yasui	180/190
5,634,685	A *	6/1997	Herring	297/219.11
5,660,245	A *	8/1997	Marier et al.	180/190
5,944,380	A *	8/1999	Atherley	297/195.1
6,491,124	B1 *	12/2002	Thompson et al.	180/190
6,749,036	B1 *	6/2004	Schrapp et al.	180/190
6,796,607	B2 *	9/2004	Bertrand et al.	297/195.13

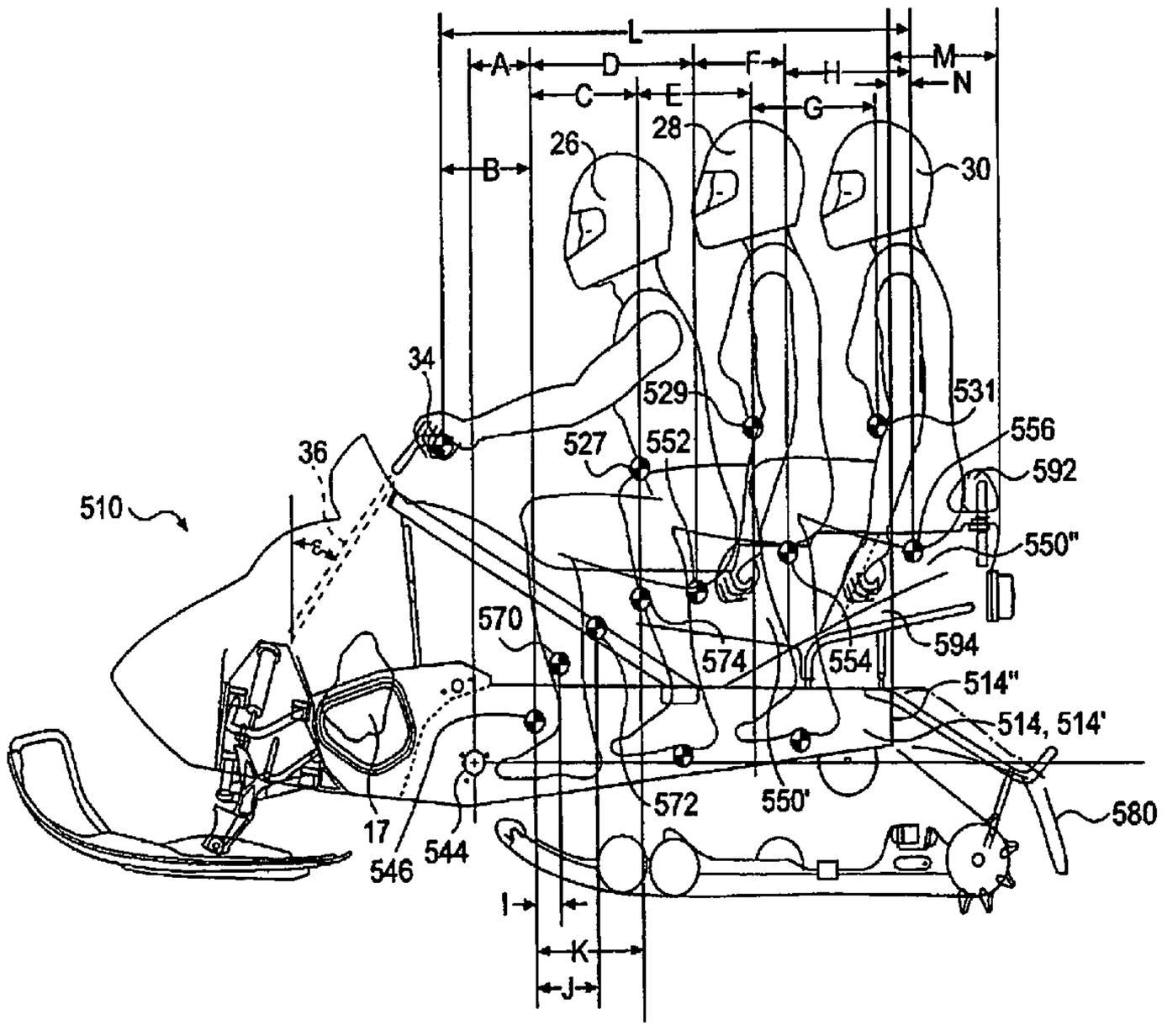
* cited by examiner

Primary Examiner—Kevin Hurley
(74) *Attorney, Agent, or Firm*—Osler, Hoskin & Harcourt LLP

(57) **ABSTRACT**

A snowmobile straddle seat assembly designed to accommodate one, two or three riders. The seat may have a continuous surface including three seating positions thereon or it may include separate seat portions where the separate seat portions may be selectively removed to provide storage space and a variety of seat configurations.

18 Claims, 25 Drawing Sheets



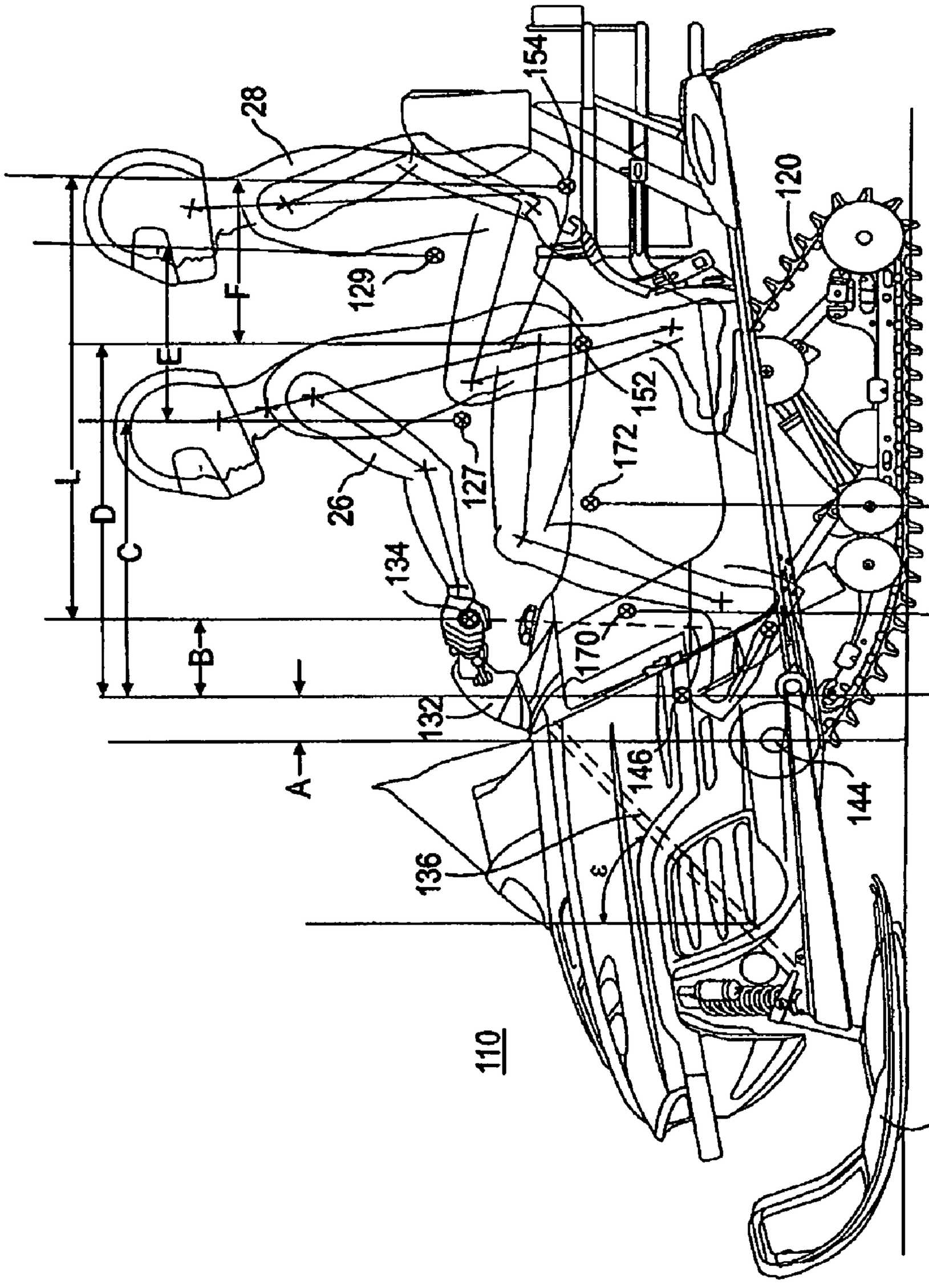


FIG. 1
PRIOR ART

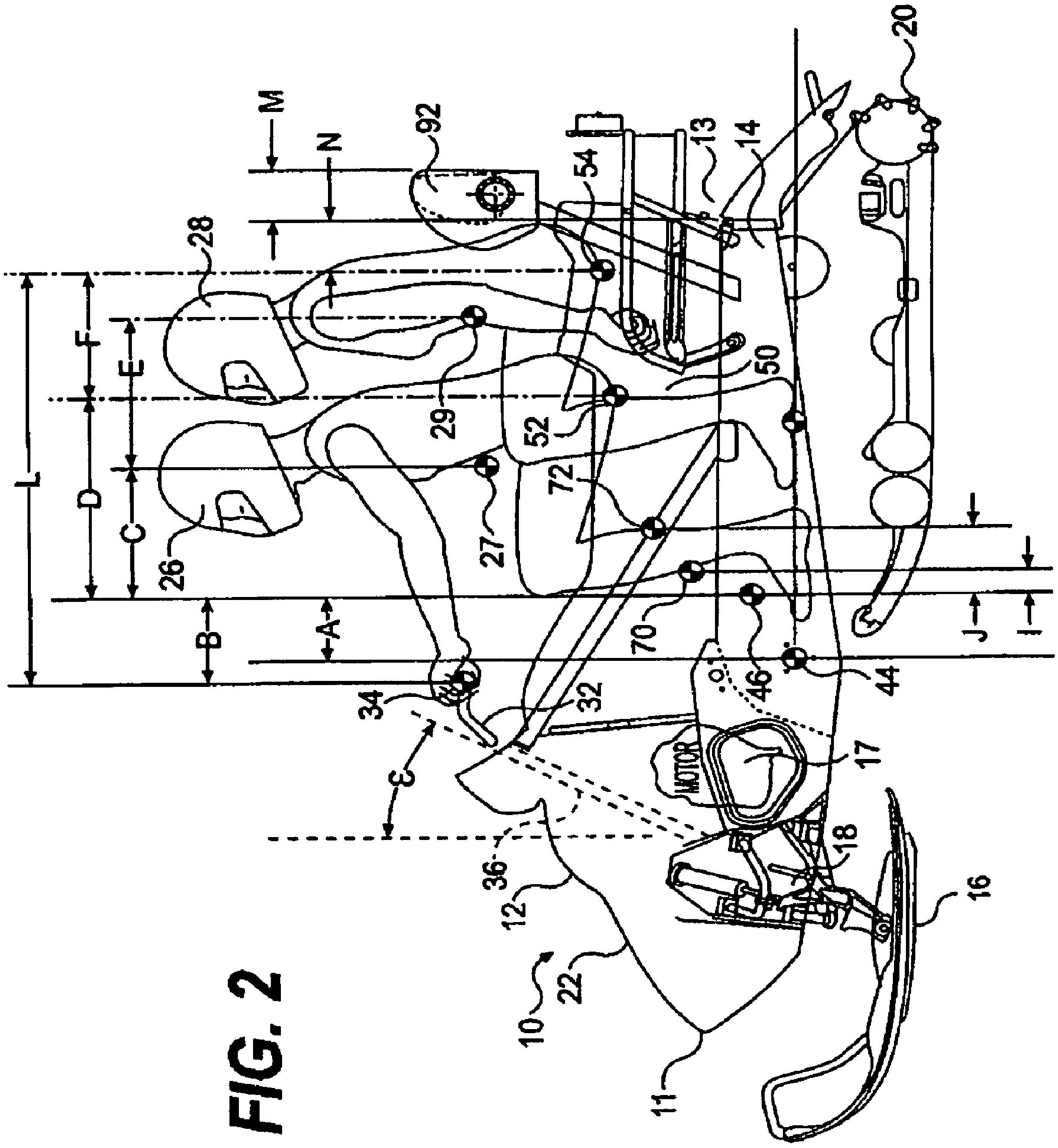

M
N
92
28
F
E
D
C
L
B
A
26
27
29
52
72
54
13
14
20
50
70
46
44
J
I
34
32
ε
MOTOR
17
18
36
12
22
10
11
16

FIG. 2

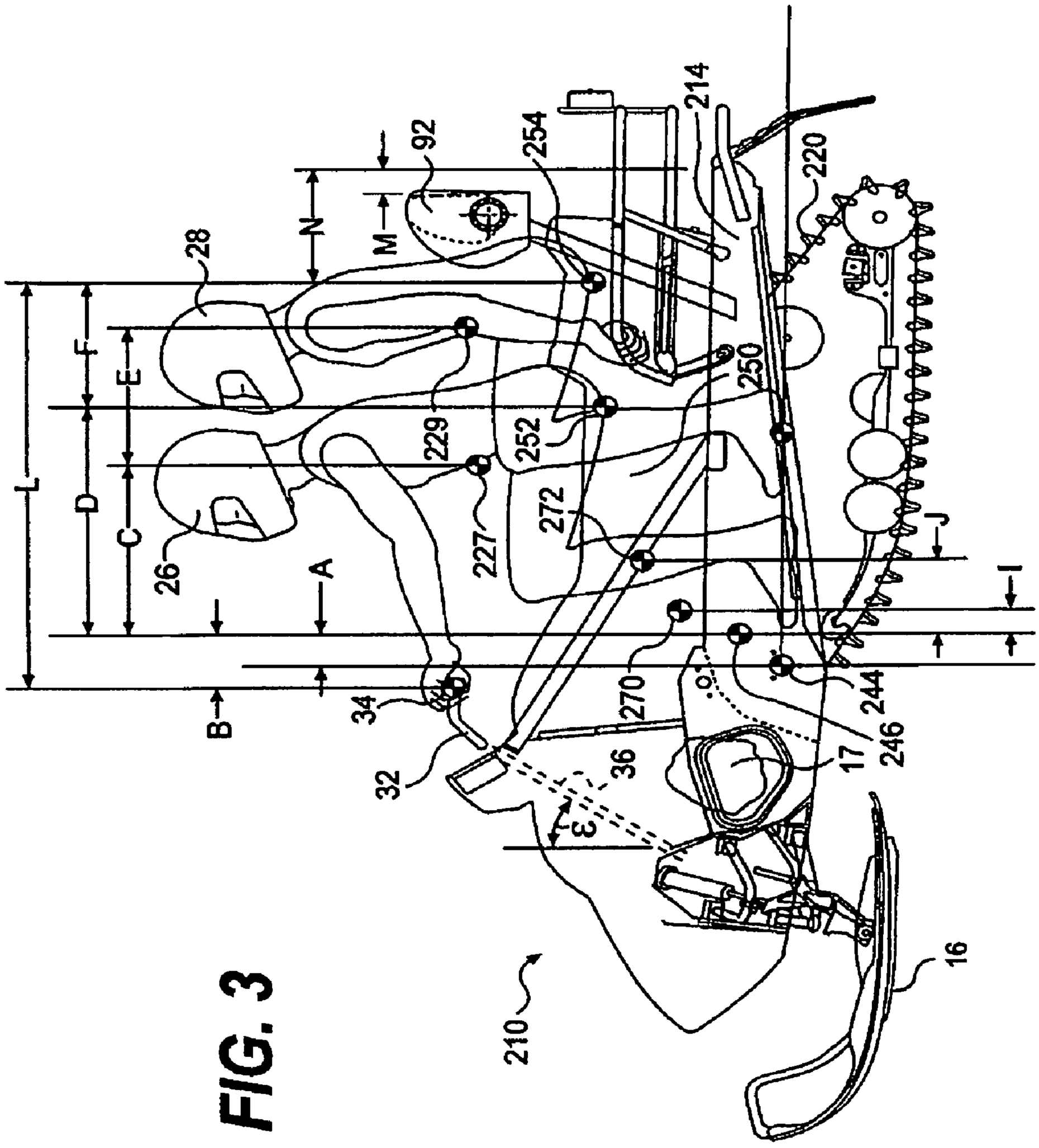

92
254
214
220
N
M
28
F
E
D
C
L
A
B
26
229
252
250
227
272
J
I
34
270
244
246
32
36
17
ω
210
16

FIG. 3

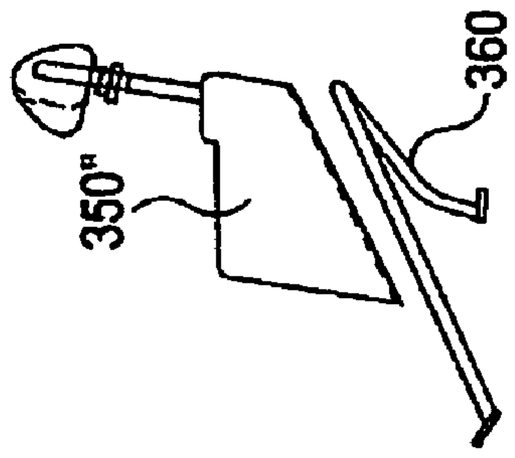

360
350"

FIG. 4B

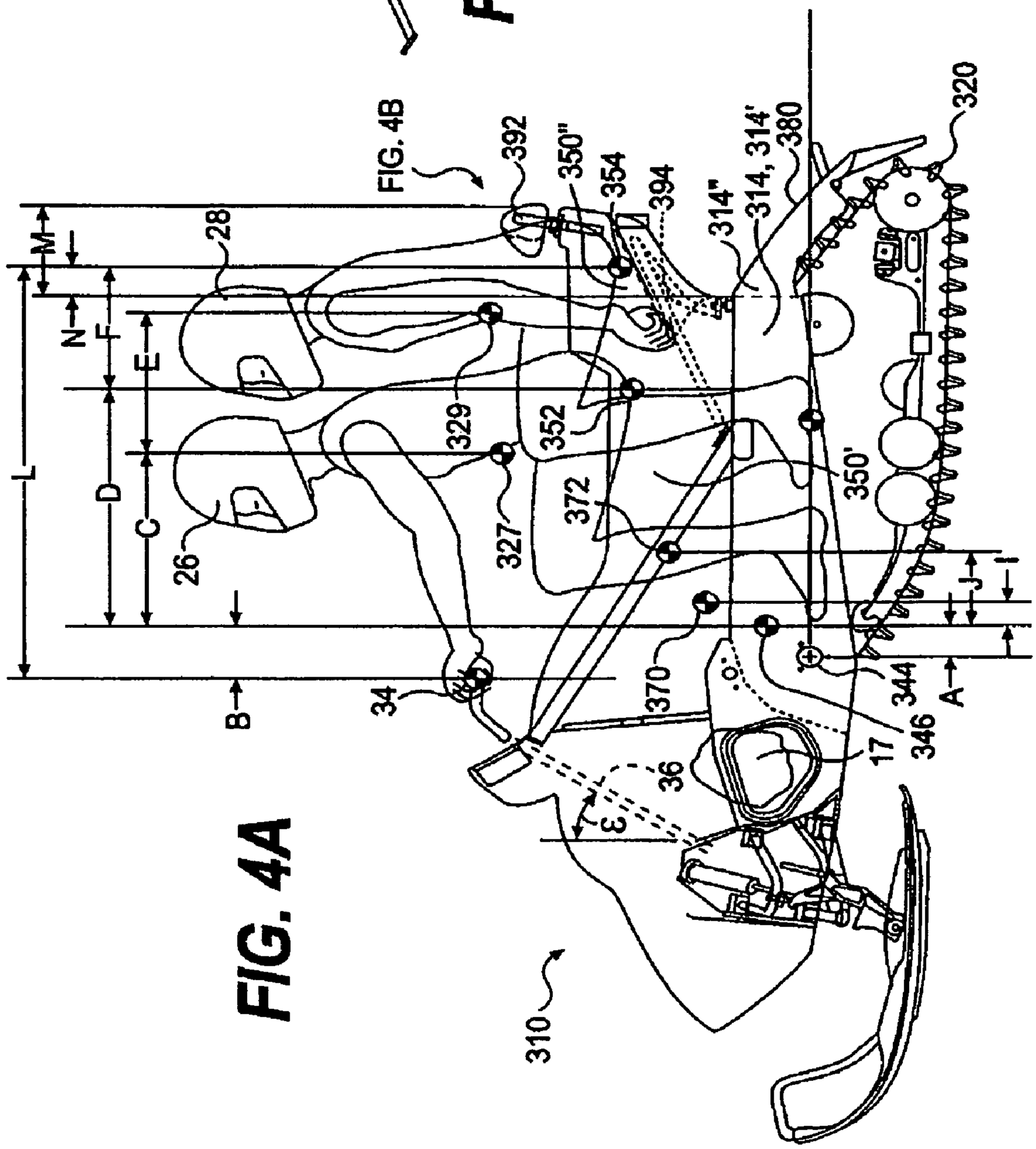


FIG. 4B
392
350"
354
394
314"
314, 314'
380
320
28
M
N
F
E
D
C
L
B
329
352
372
327
26
350'
34
370
344
A
J
I
346
17
36
ω
310

FIG. 4A

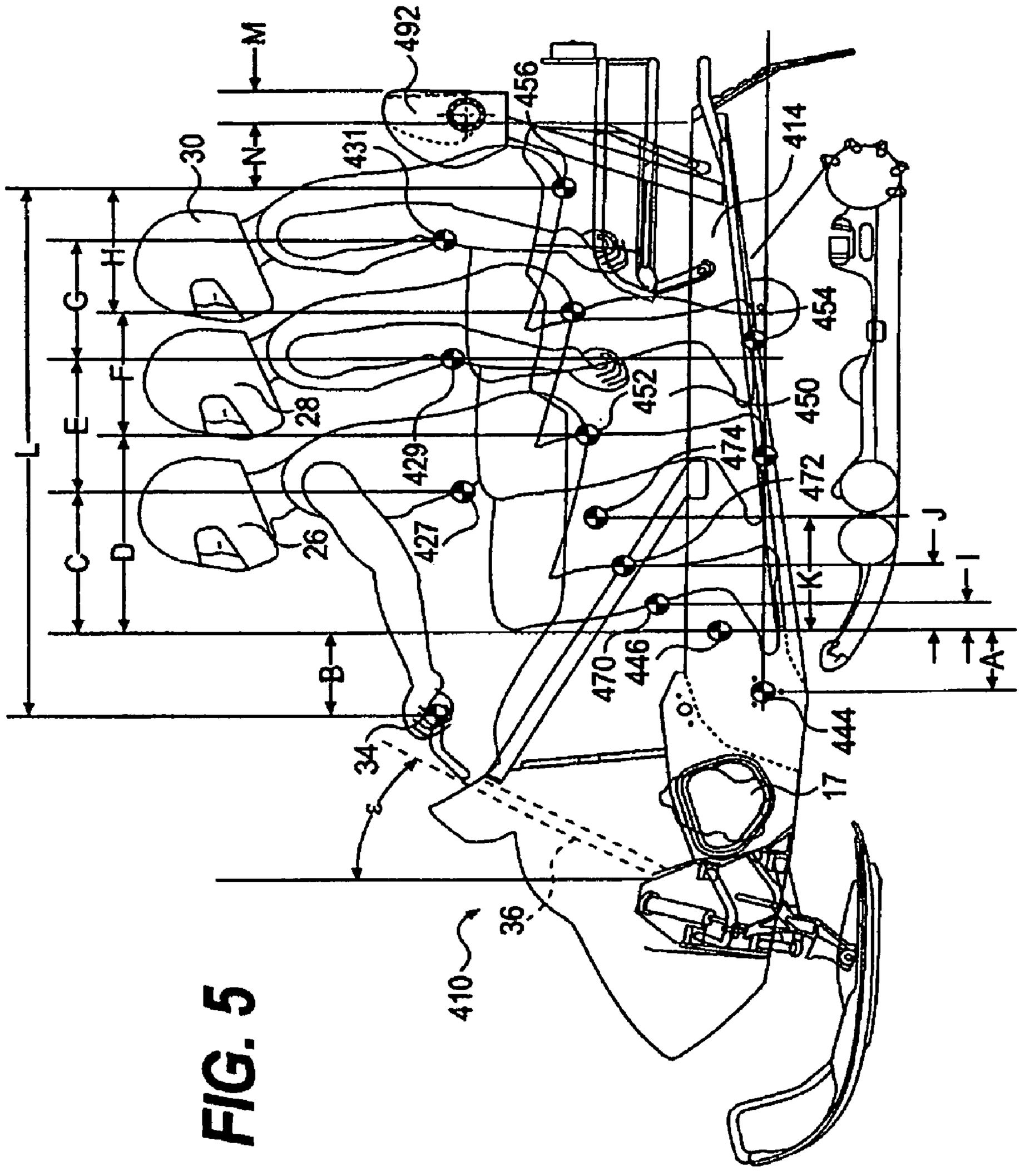

M
N
L
C
D
E
F
G
H
B
A
I
J
K
30
28
26
34
36
410
492
456
431
414
454
452
450
474
472
429
427
470
446
444
17

FIG. 5

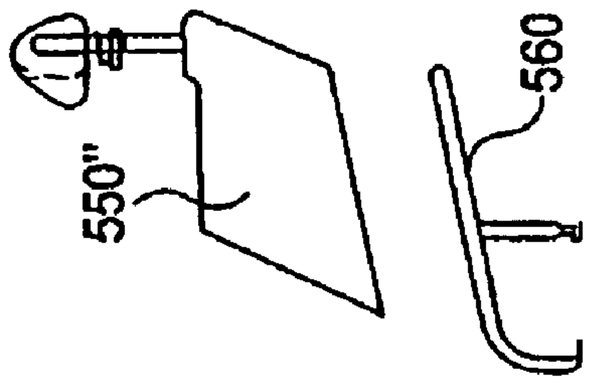

550"
560

FIG. 6B

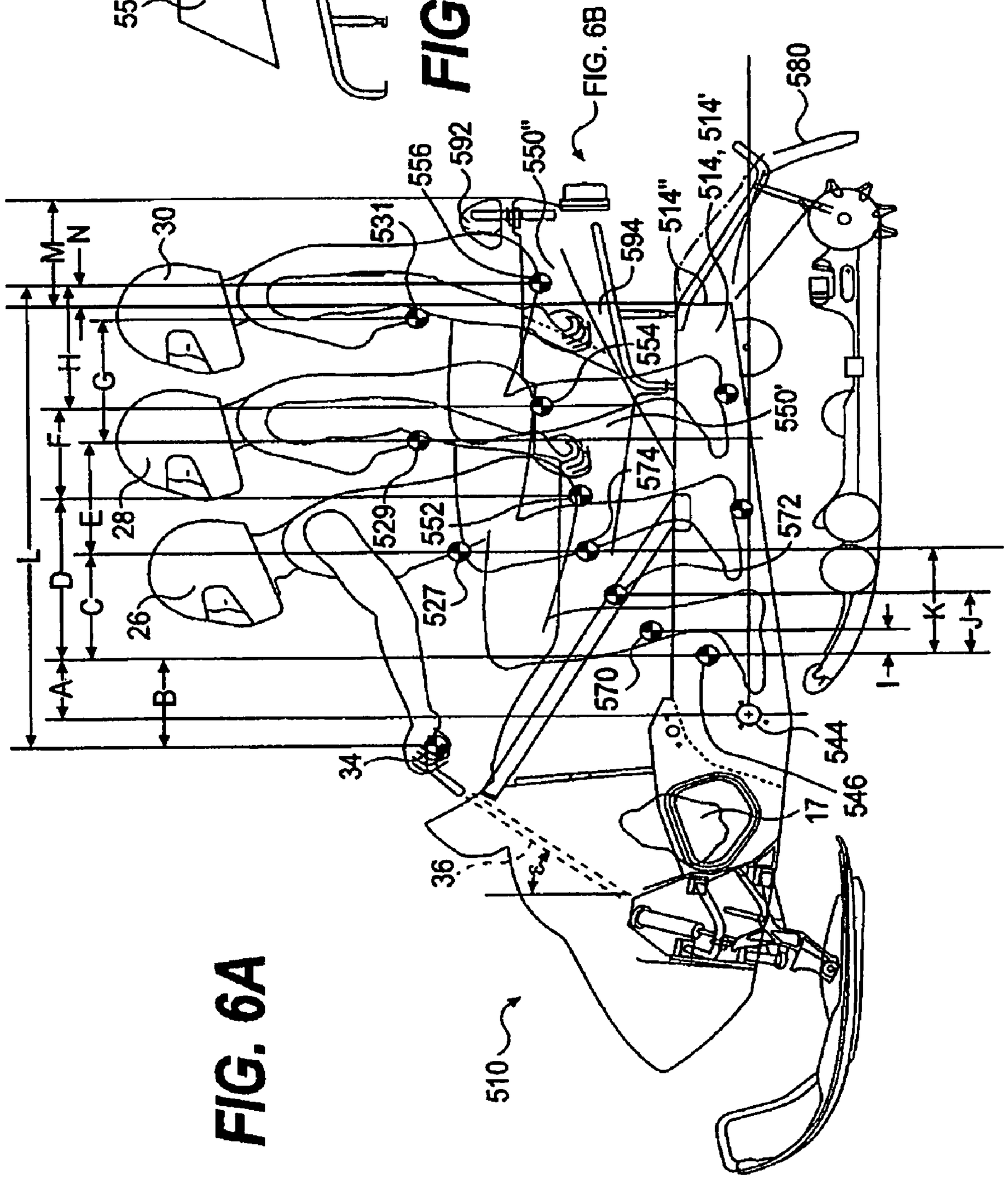


FIG. 6B
580
514, 514'
514"
550"
556
592
531
30
594
554
550'
574
572
28
529
552
527
26
570
544
546
17
34
36
510
L
M
N
H
G
F
E
D
C
A
B
I
K
J

FIG. 6A

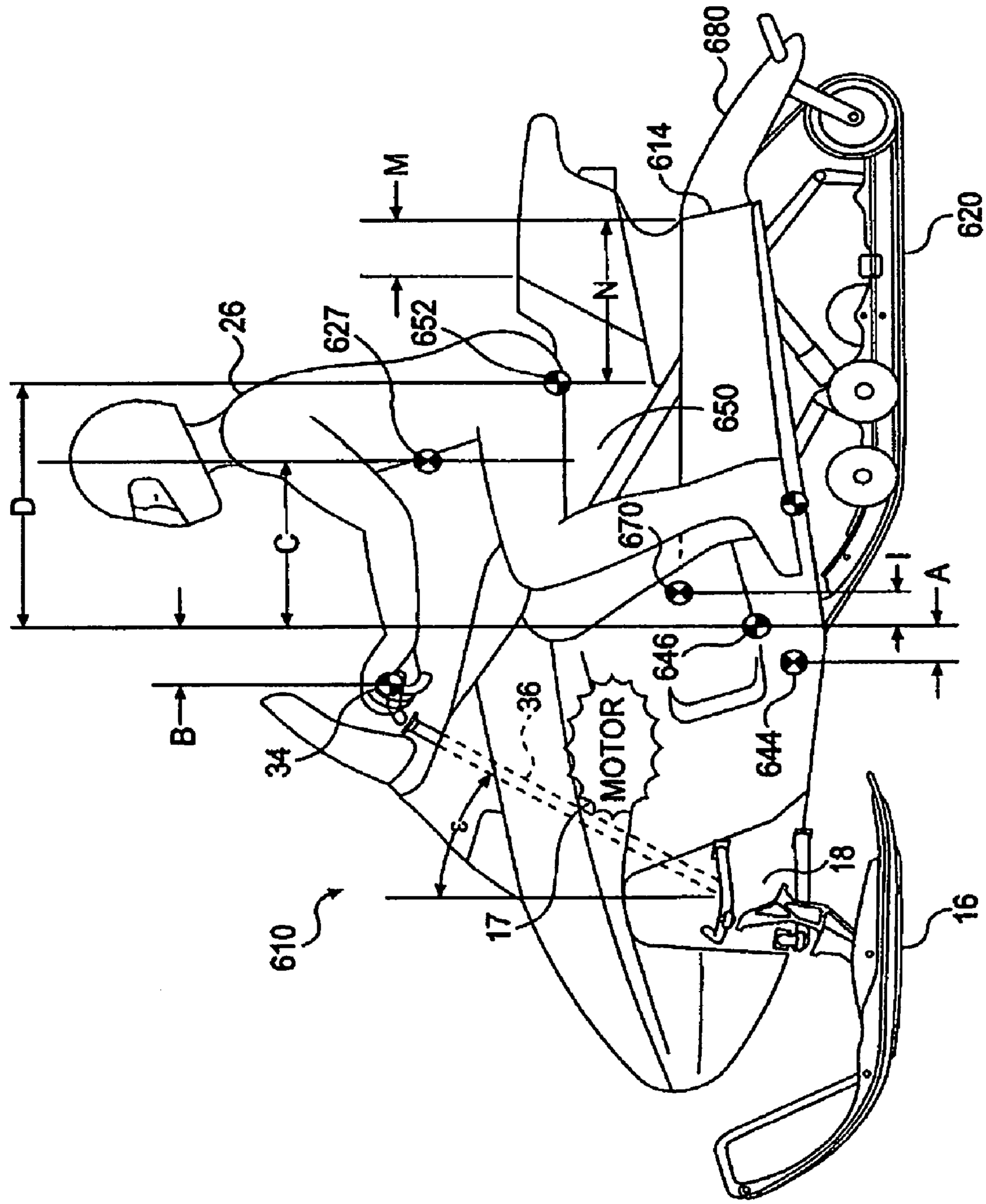
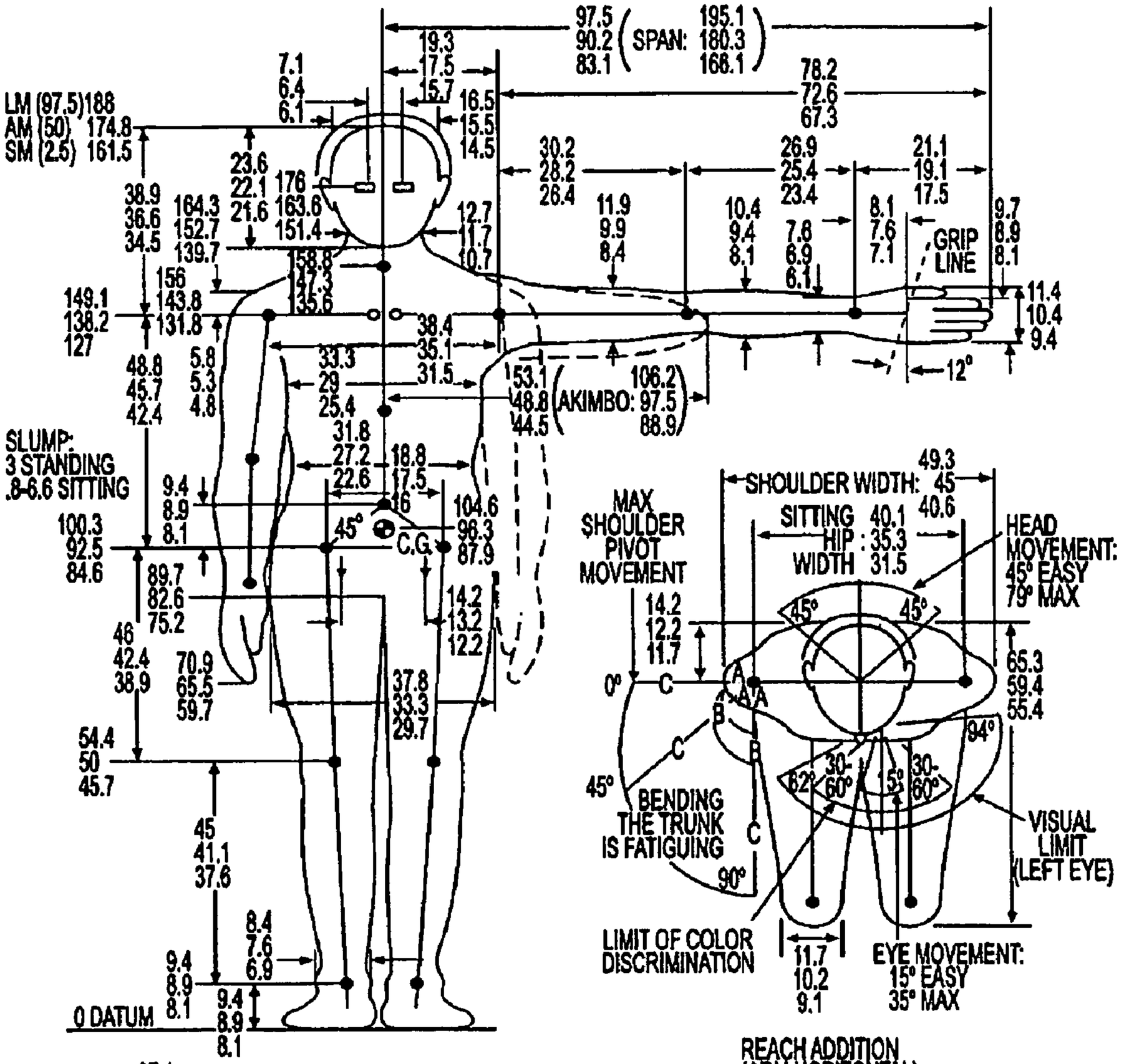

680
614
620
M
N
26
627
652
650
D
C
670
I
A
646
644
B
34
36
MOTOR
3
18
16
17
610

FIG. 7

DISTANCE (mm)			VEHICLE							
			CONVENTIONAL		INVENTION					
REF.#	FROM:	TO (GOING BACK):	LONG	SHORT	1ST EMBODIMENT 2-UP LONG (FIG. 2)	2ND EMBODIMENT 2-UP SHORT (FIG. 3)	3RD EMBODIMENT 1+1 SHORT (FIG. 4A)	4TH EMBODIMENT 3-UP LONG (FIG. 5)	5TH EMBODIMENT 2+1 LONG (FIG. 6A)	6TH EMBODIMENT 1-UP (FIG. 7)
A	FORWARD AXLE	CG (VEHICLE)	110	30	65	95	95	170	170	95
B	STEERING POS.	CG (VEHICLE)	-160	-240	130	160	160	235	235	160
C	CG (VEHICLE)	CG (RIDER 1)	645	725	350	320	320	245	245	320
D	CG (VEHICLE)	SEAT POS (1)	795	875	500	470	470	395	395	470
E	CG (RIDER 1)	CG (RIDER 2)	370	370	370	370	370	370	370	N/A
F	SEAT POS (1)	SEAT POS (2)	340	340	340	340	340	340	290	N/A
G	CG (RIDER 2)	CG (RIDER 3)	N/A	N/A	N/A	N/A	N/A	310	345	N/A
H	SEAT POS (2)	SEAT POS (3)	N/A	N/A	N/A	N/A	N/A	310	345	N/A
I	CG (VEHICLE)	CG (V+1 RIDER)	180	160	70	50	50	60	70	50
J	CG (VEHICLE)	CG (V+2 RIDERS)	290	260	175	190	190	170	170	N/A
K	CG (VEHICLE)	CG (V+3 RIDERS)	N/A	N/A	N/A	N/A	N/A	300	300	N/A
L	STEER POS.	REAR SEAT POS.	975	975	970	970	970	1280	1265	N/A
M	BACK OF FRAME	BACK OF SEAT	-50	0	100	-100	230	60	290	-110
N	BACK OF FRAME	REAR SEAT POS.	-290	-120	-130	-340	80	-200	60	-260
ANGLES (DEGREES)										
EPSILON VERT. AND STEERING SHAFT			>=45	>=45	ALL <45, PREFERABLY 25-40, MORE PREFERABLY 30-35, MOST PREFERABLY 33					

FIG. 8



REACH SUBTRACTION

HAND GRIP	13.7 12.2 11.2	FINGER GRIP	8.9 7.9 6.6

REACH ADDITION (ARM HORIZONTAL)

DIRECTION		0°	45°	90°
EXTEND SHOULDER	A	5.1	7.6	10.2
ROTATE TRUNK	B	0	2.5	5.1
BEND TRUNK	C	15.2	20.3	25.4
TOTAL		20.3	30.5	40.6

FIG. 9

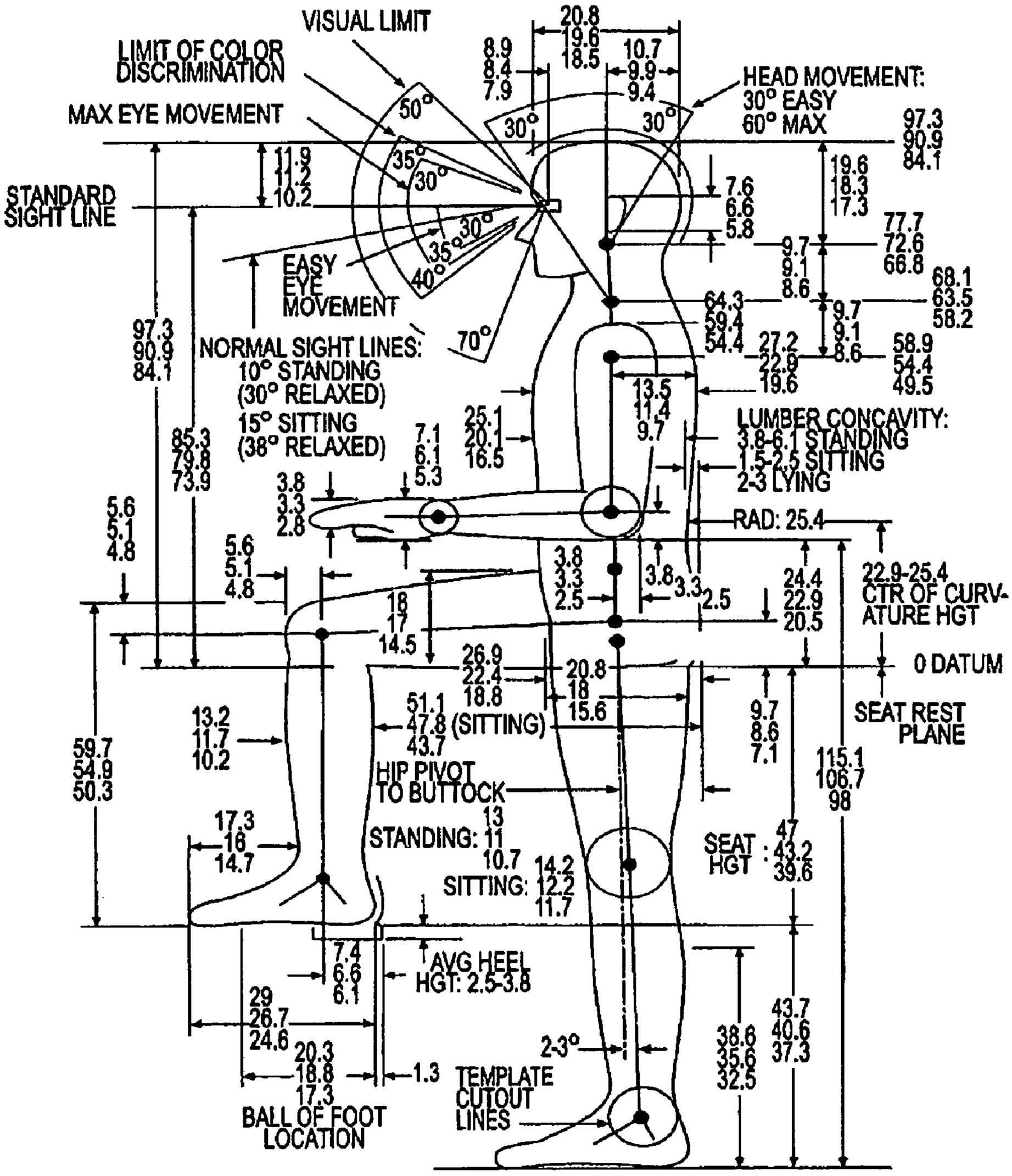

VISUAL LIMIT
LIMIT OF COLOR DISCRIMINATION
MAX EYE MOVEMENT
STANDARD SIGHT LINE
EASY EYE MOVEMENT
NORMAL SIGHT LINES:
10° STANDING
(30° RELAXED)
15° SITTING
(38° RELAXED)
HEAD MOVEMENT:
30° EASY
60° MAX
LUMBER CONCAVITY:
3.8-6.1 STANDING
1.5-2.5 SITTING
2-3 LYING
RAD: 25.4
22.9-25.4
CTR OF CURV-
ATURE HGT
0 DATUM
SEAT REST
PLANE
HIP PIVOT
TO BUTTOCK
STANDING: 13 11 10.7
SITTING: 14.2 12.2 11.7
SEAT HGT : 47 43.2 39.6
AVG HEEL
HGT: 2.5-3.8
2-3°
TEMPLATE
CUTOUT
LINES
BALL OF FOOT
LOCATION
1.3
50°
35°
30°
40°
70°
30°
30°
20.8 19.6 18.5
8.9 8.4 7.9
10.7 9.9 9.4
11.9 11.2 10.2
97.3 90.9 84.1
19.6 18.3 17.3
7.6 6.6 5.8
77.7 72.6 66.8
9.7 9.1 8.6
68.1 63.5 58.2
64.3 59.4 54.4
27.2 22.9 19.6
9.7 9.1 8.6
58.9 54.4 49.5
13.5 11.4 9.7
25.1 20.1 16.5
7.1 6.1 5.3
85.3 79.8 73.9
3.8 3.3 2.8
5.6 5.1 4.8
5.6 5.1 4.8
18 17 14.5
3.8 3.3 2.5
3.8 3.3 2.5
24.4 22.9 20.5
26.9 22.4 18.8
20.8 18 15.6
51.1 47.8 43.7
9.7 8.6 7.1
115.1 106.7 98
59.7 54.9 50.3
13.2 11.7 10.2
17.3 16 14.7
7.4 6.6 6.1
29 26.7 24.6
20.3 18.8 17.3
43.7 40.6 37.3
38.6 35.6 32.5

FIG. 10

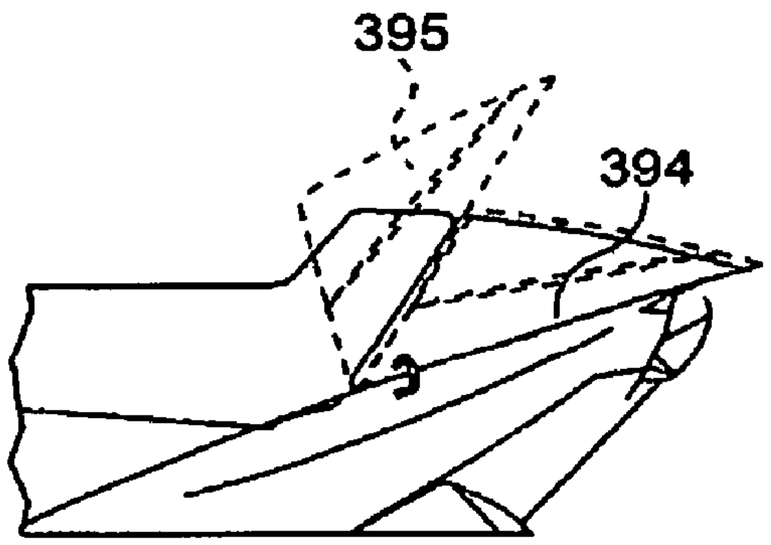


FIG. 11A

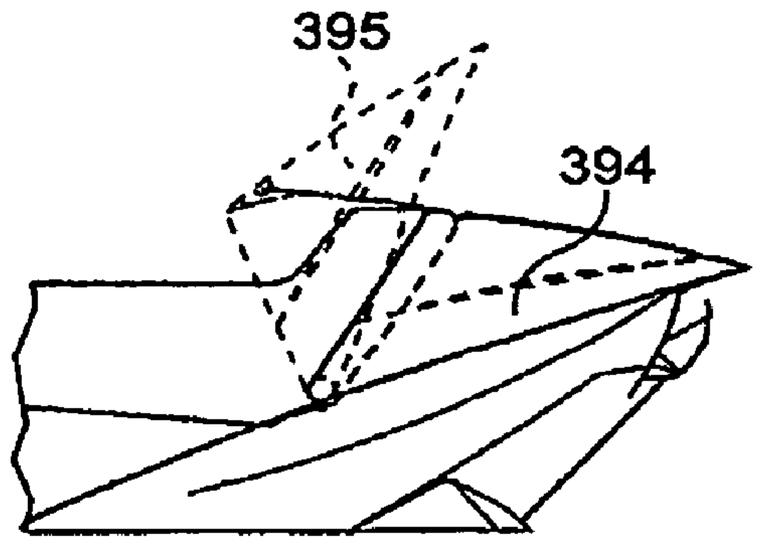


FIG. 11B

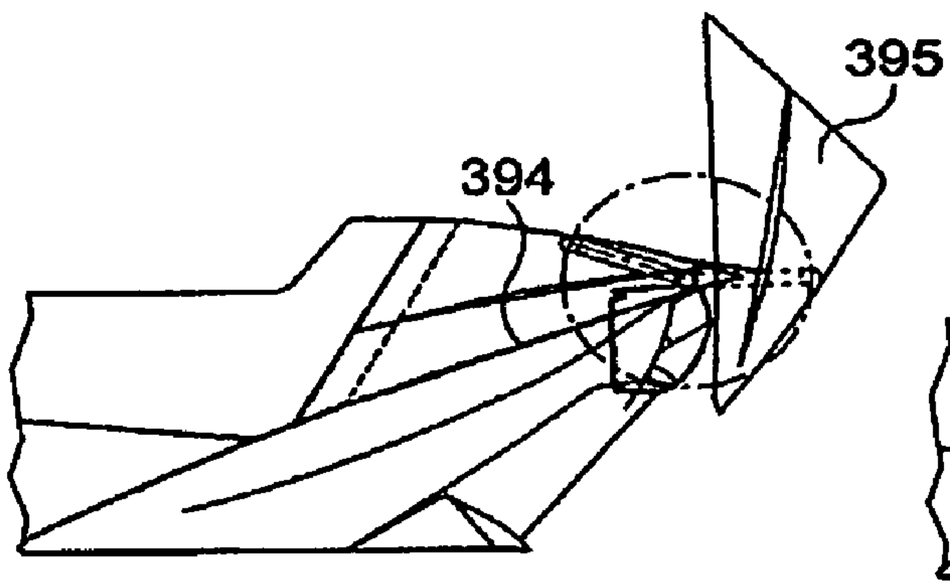


FIG. 11C

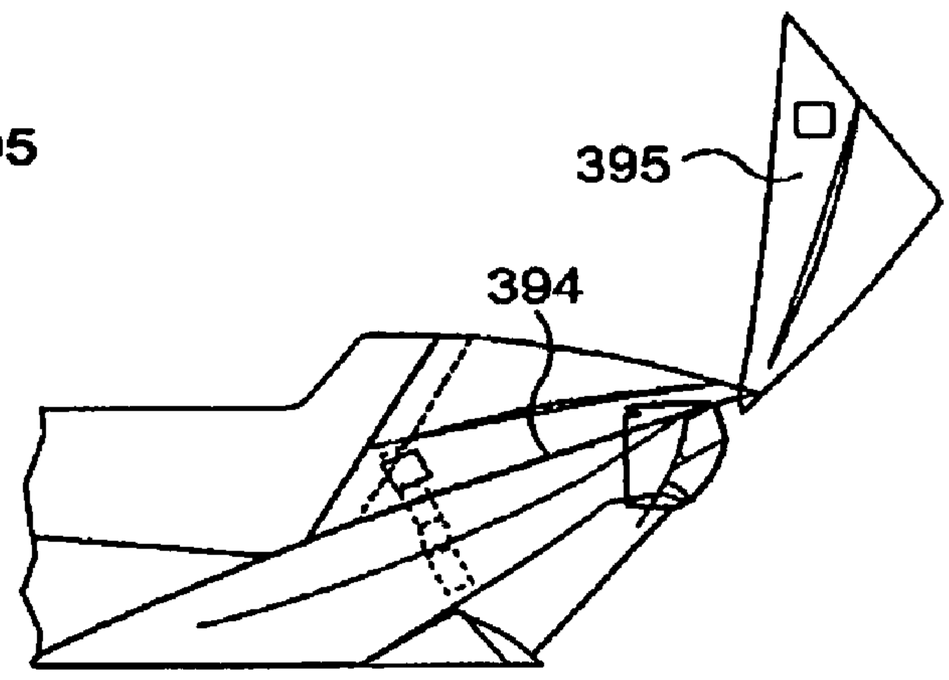


FIG. 11D

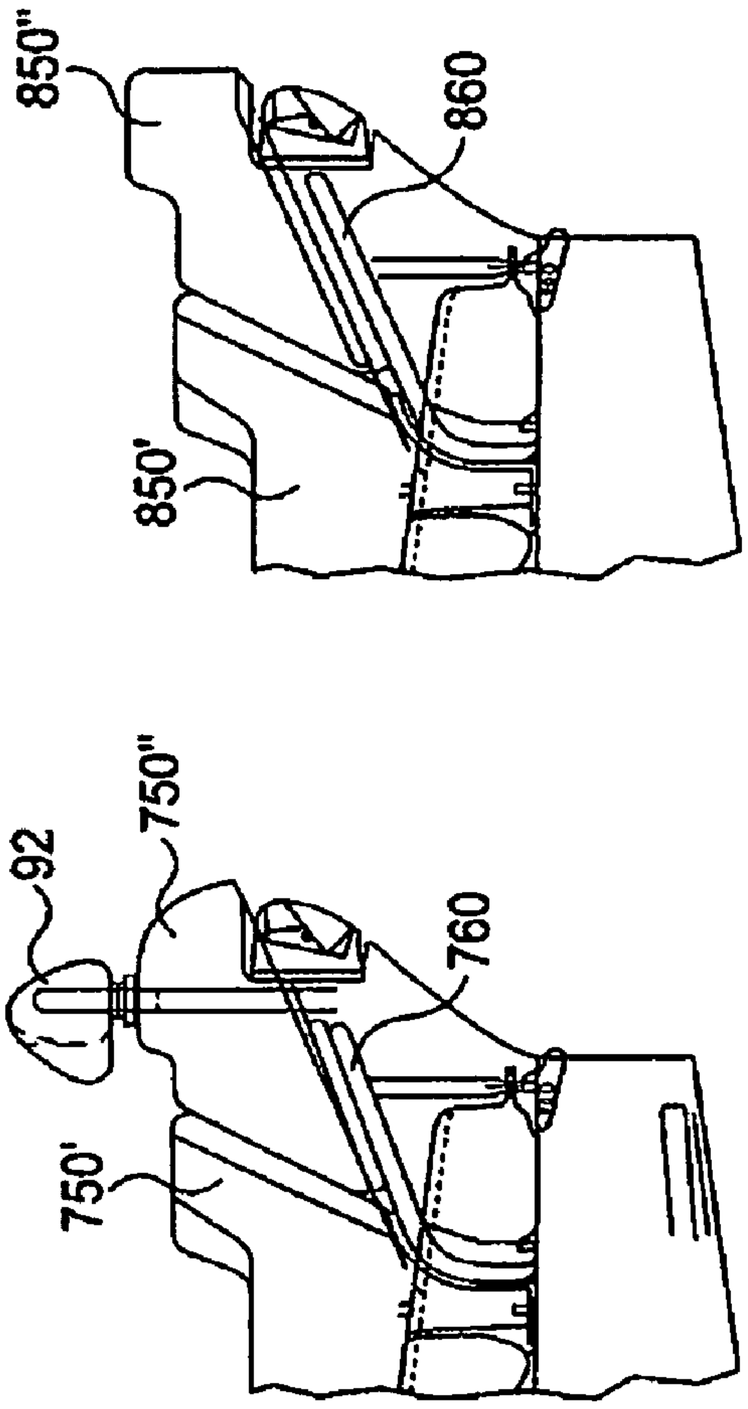


FIG. 12C

FIG. 12B

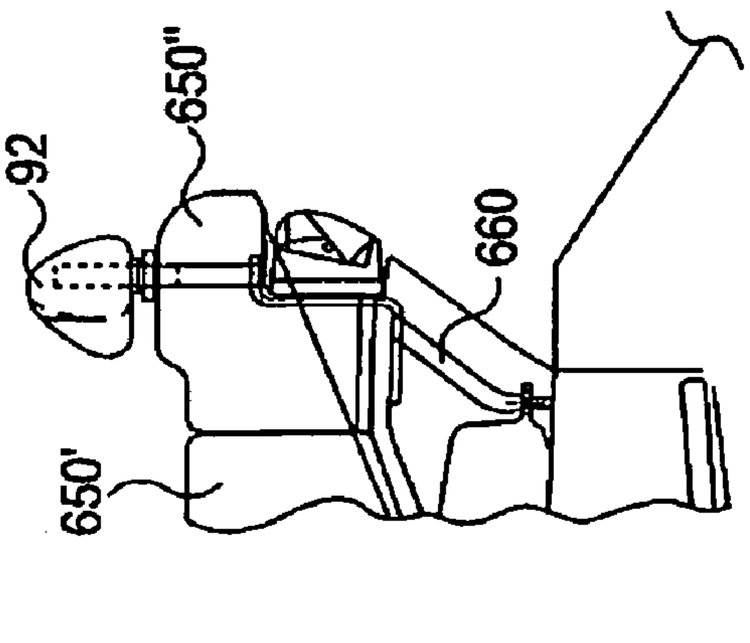


FIG. 12A

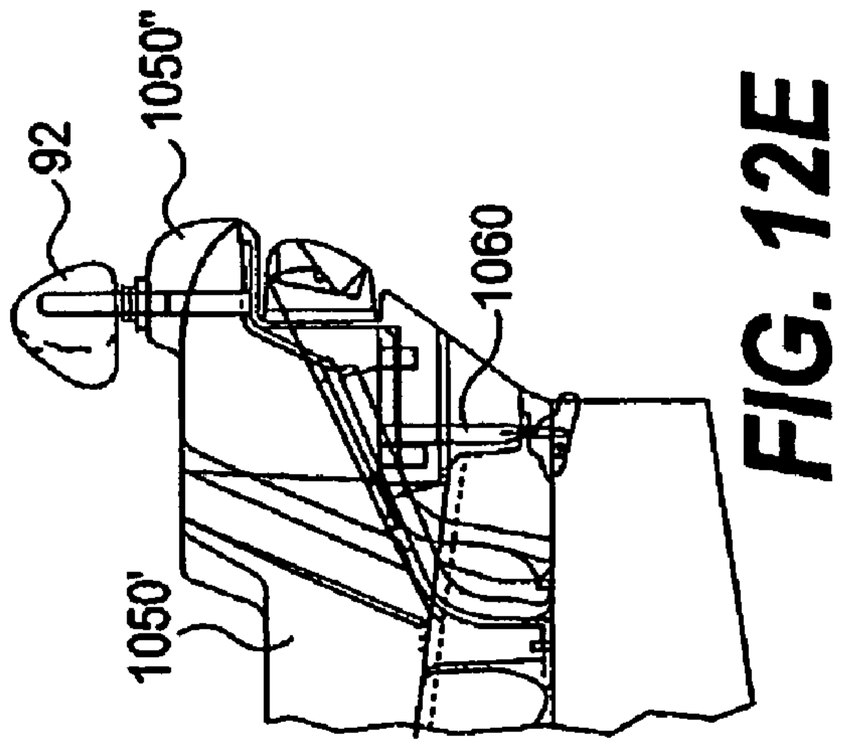


FIG. 12E

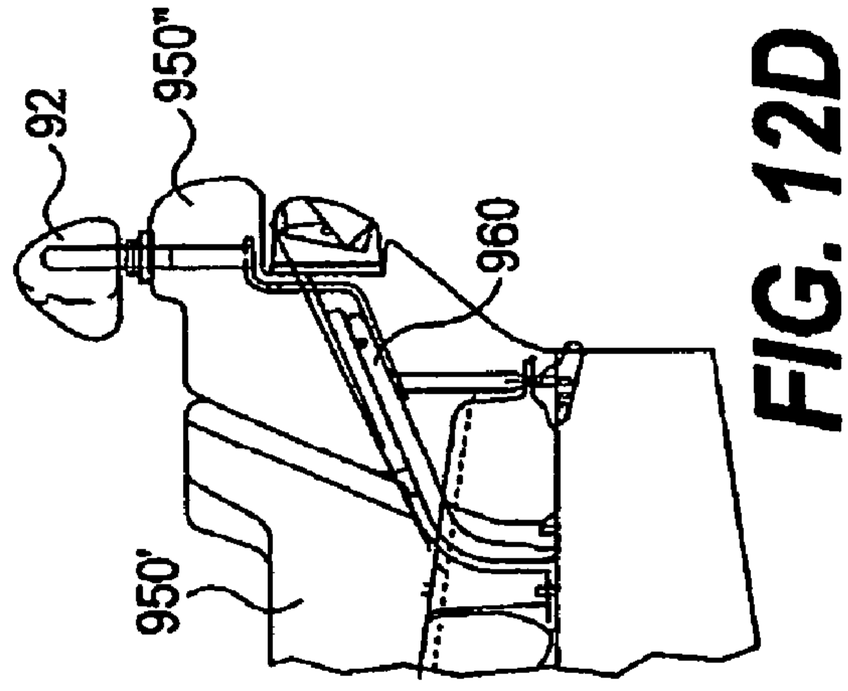


FIG. 12D

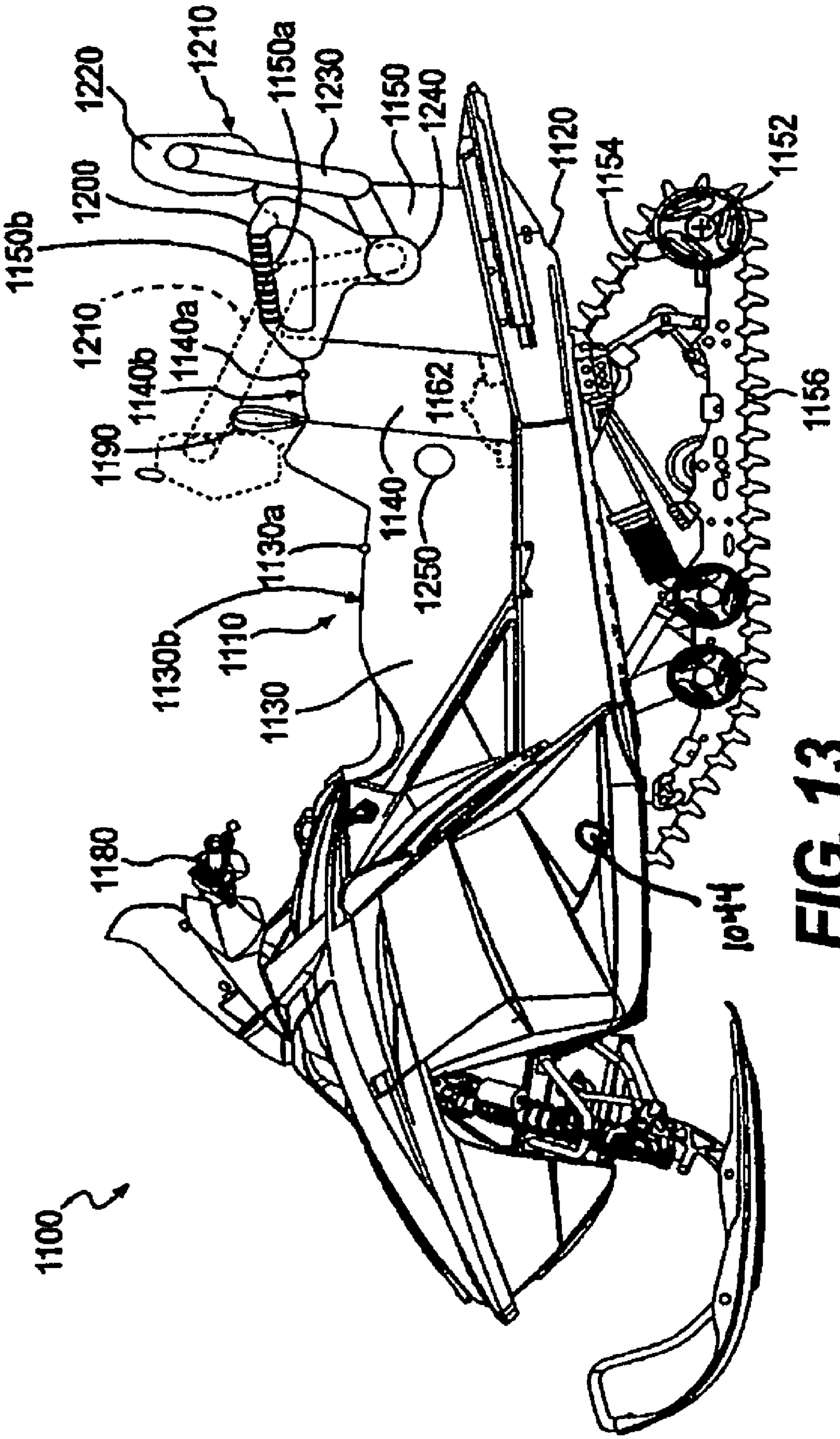

1210
1220
1150a
1230
1150
1240
1120
1154
1152
1150b
1200
1210
1140a
1140b
1190
1162
1156
1140
1250
1130a
1130b
1110
1130
1180
1104
1100

FIG. 13

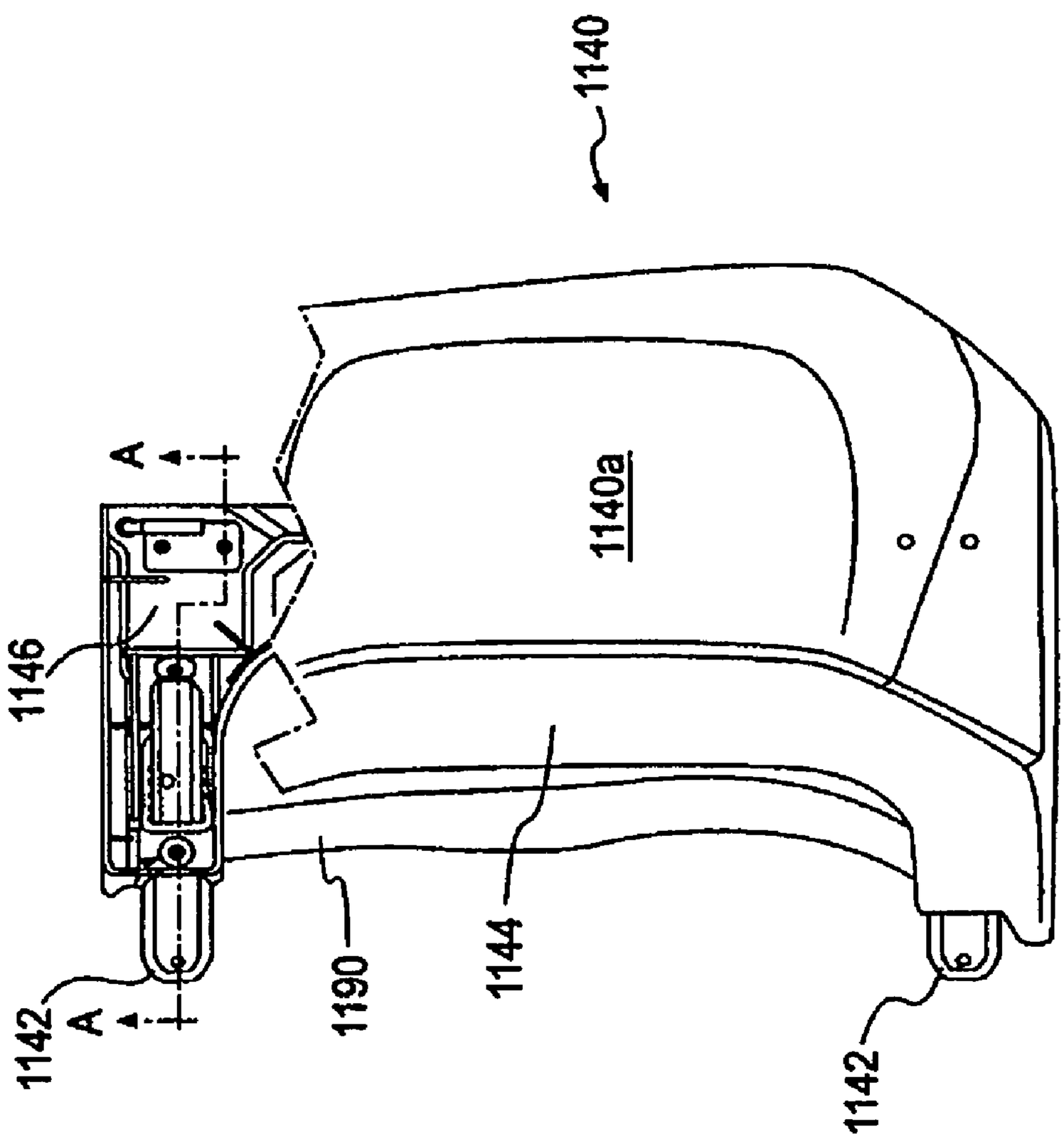


FIG. 13A

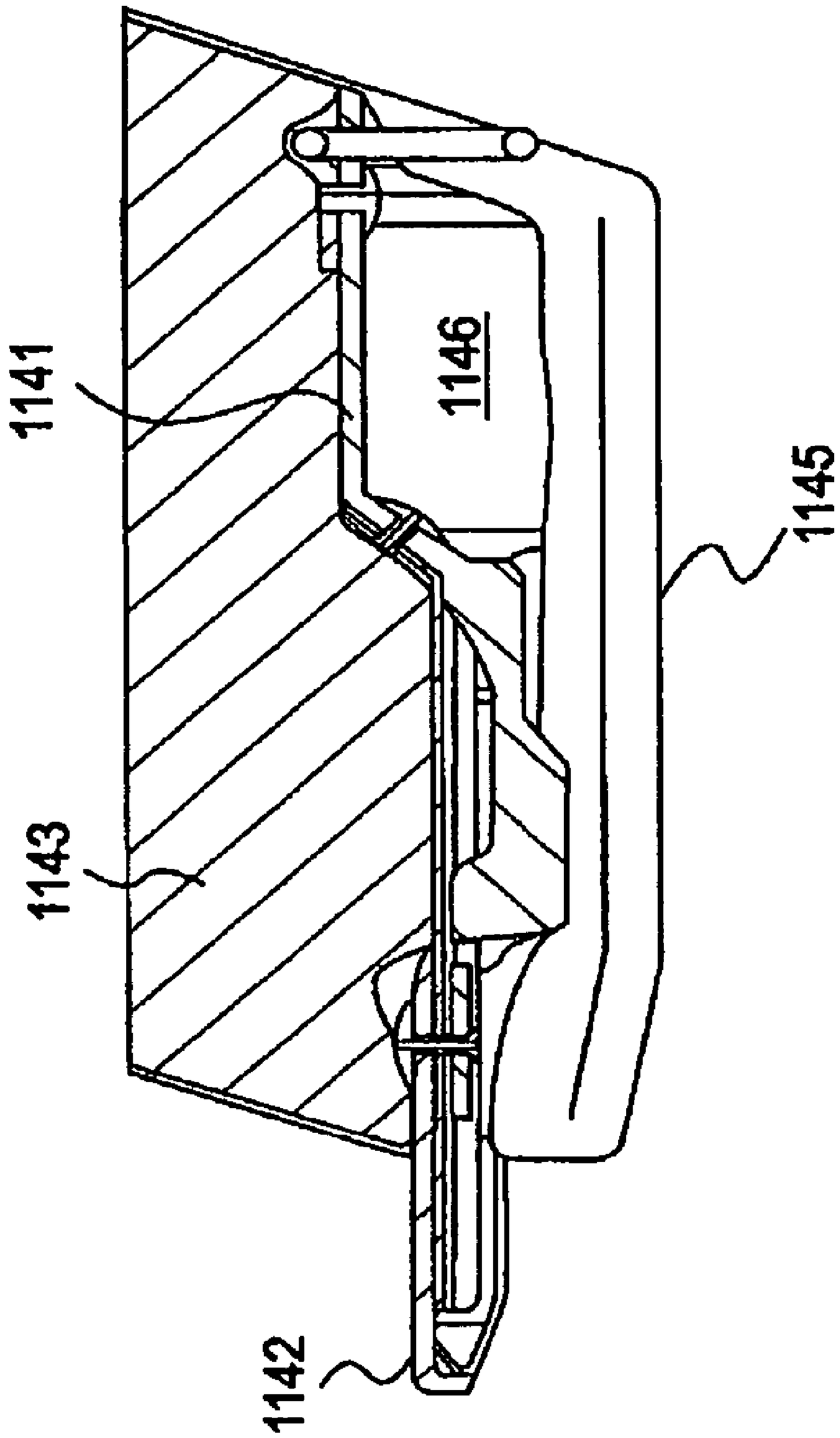


FIG. 13B

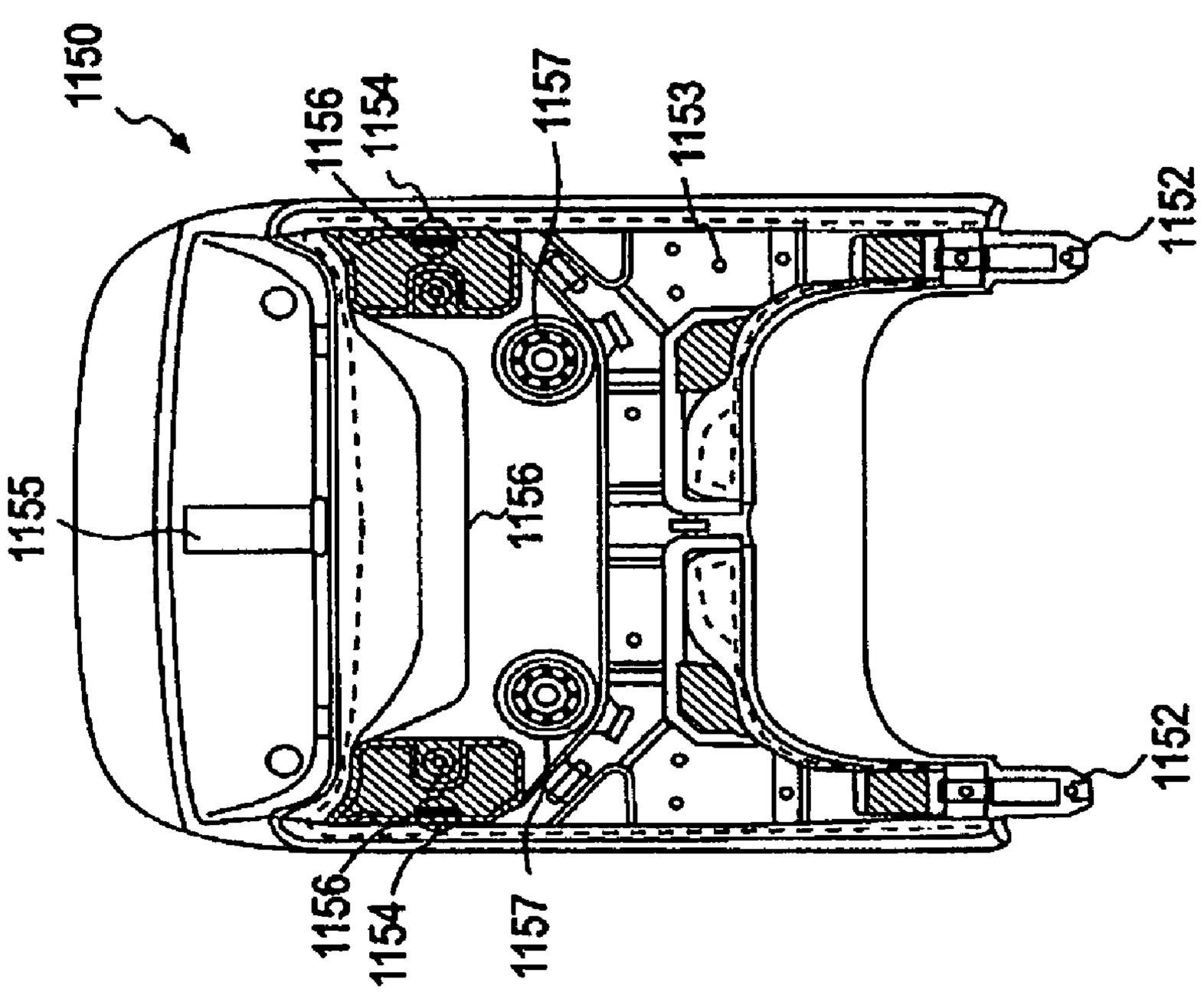


FIG. 13C

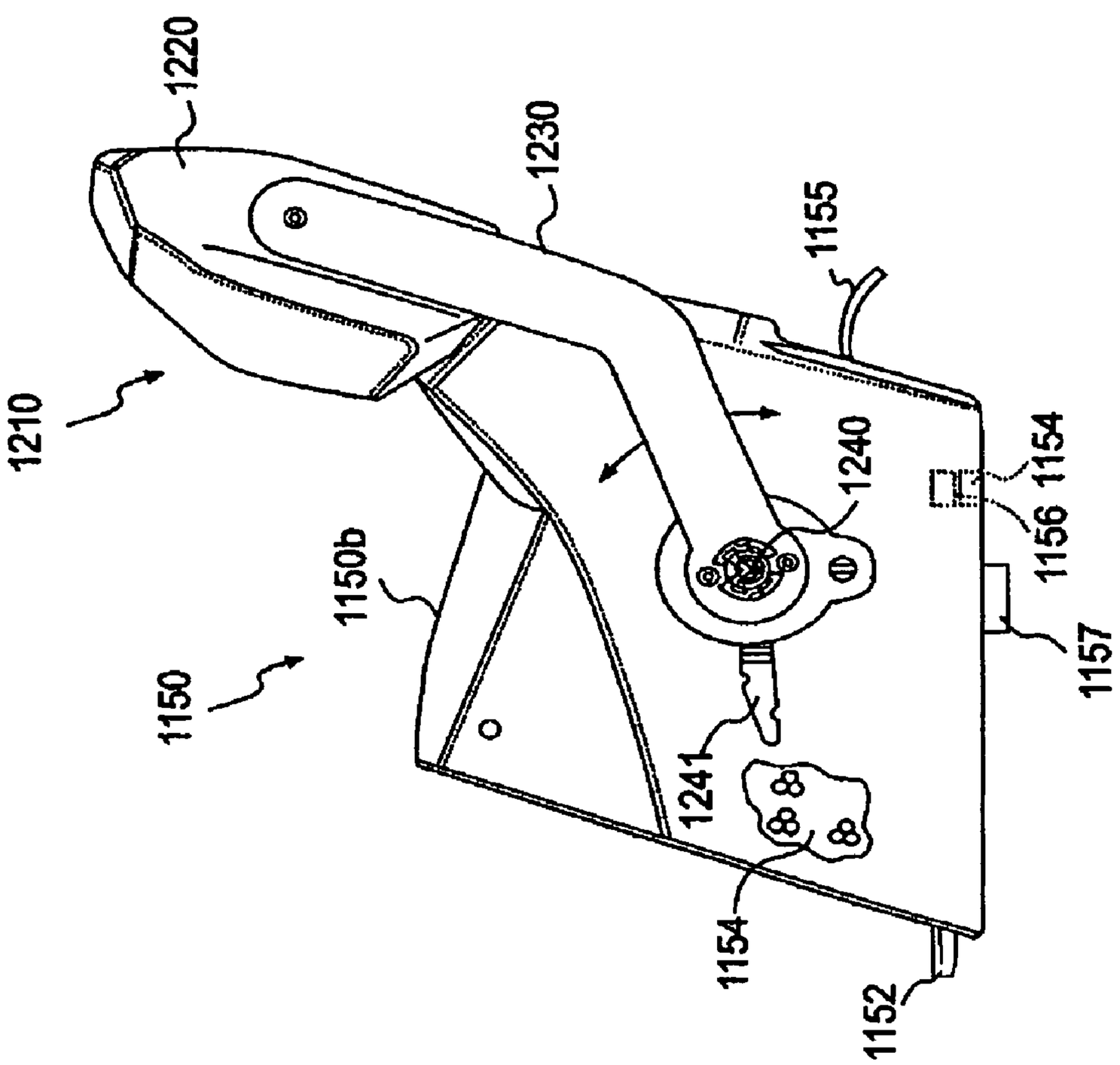

1220
1230
1155
1210
1240
1154
1156
1150b
1150
1157
1241
1154
1151
1152

FIG. 13D

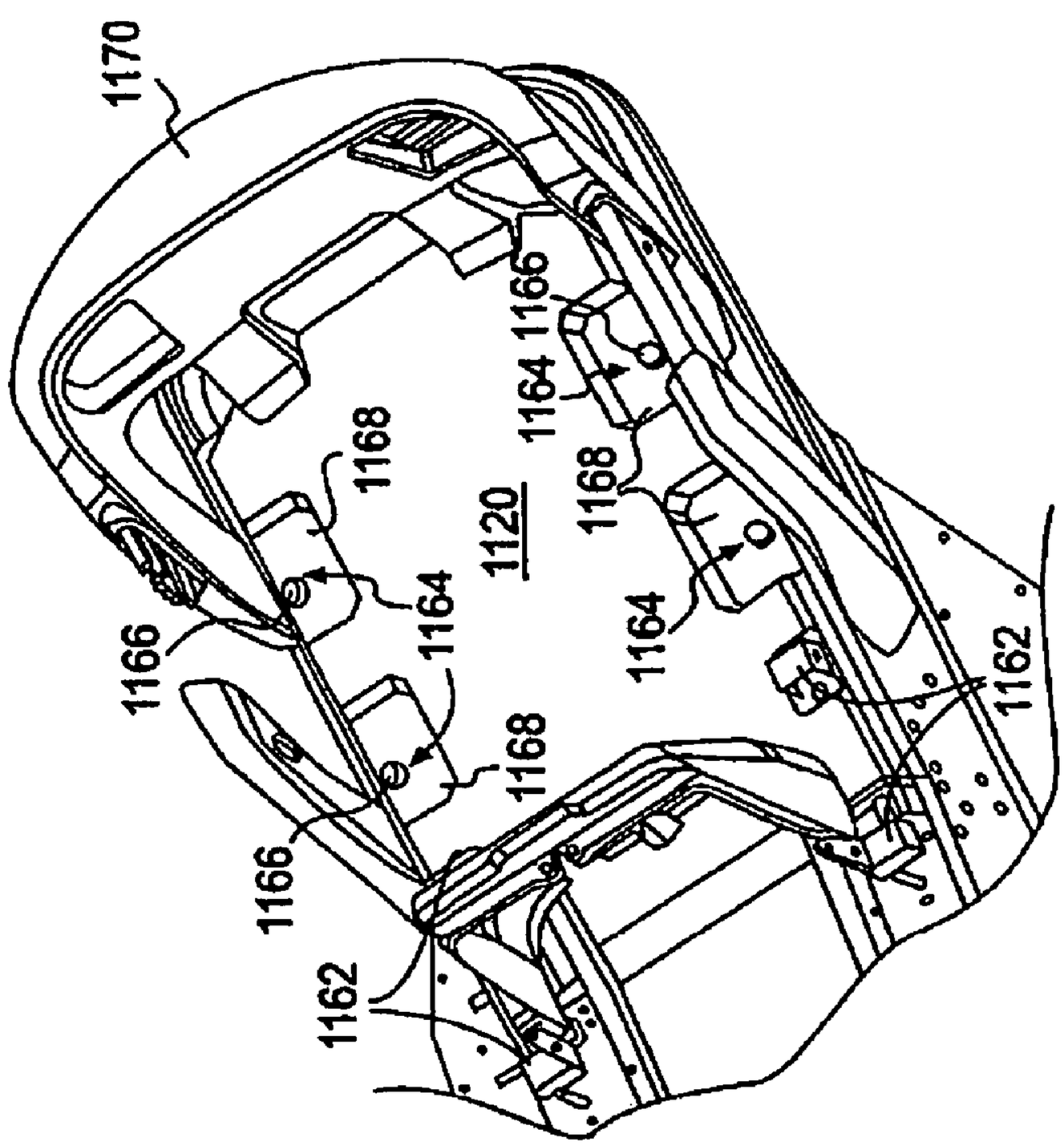

1170
1166
1164
1168
1120
1164
1166
1168
1166
1164
1168
1166
1164
1162
1162

FIG. 13E

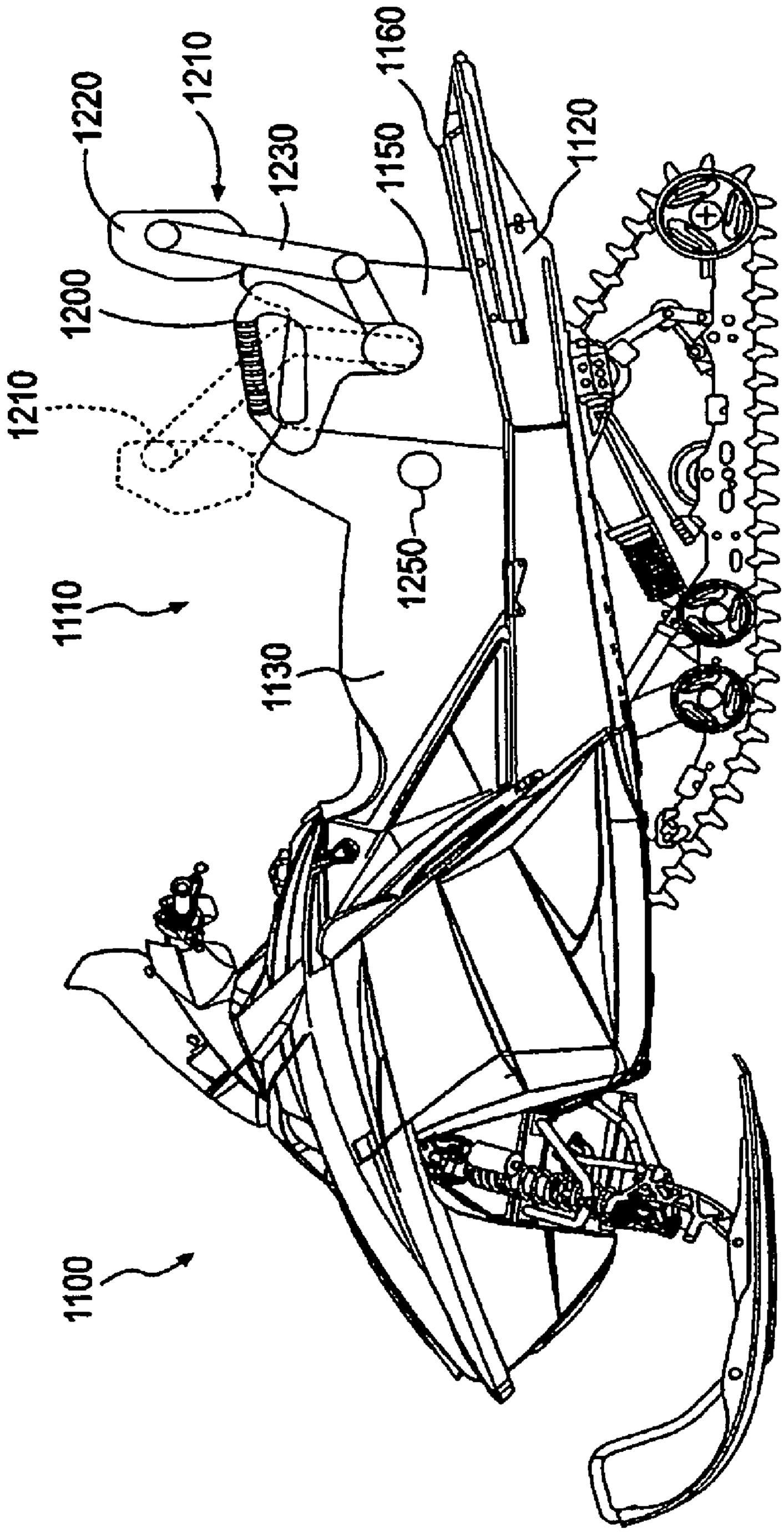


FIG. 14

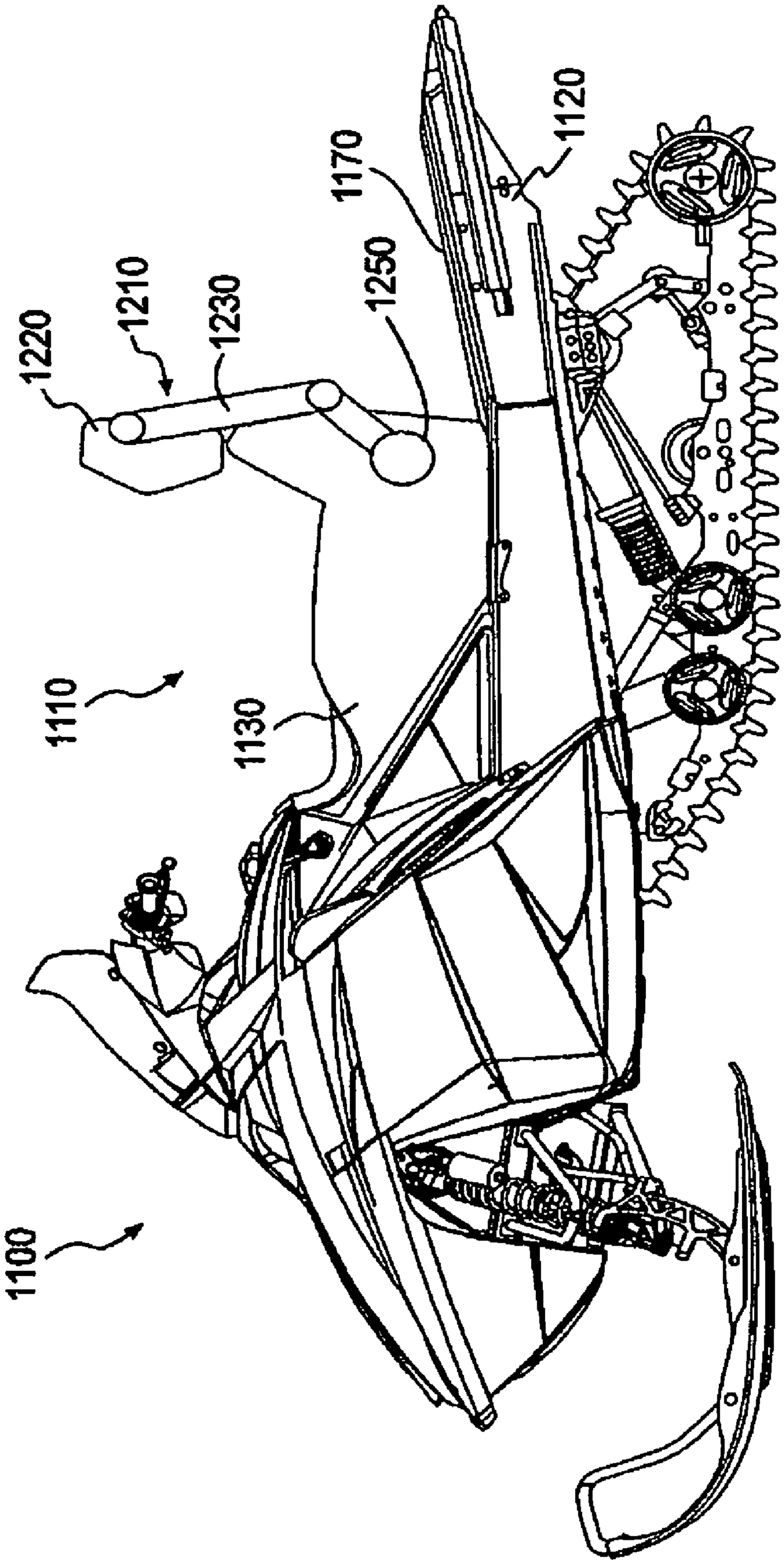


FIG. 15

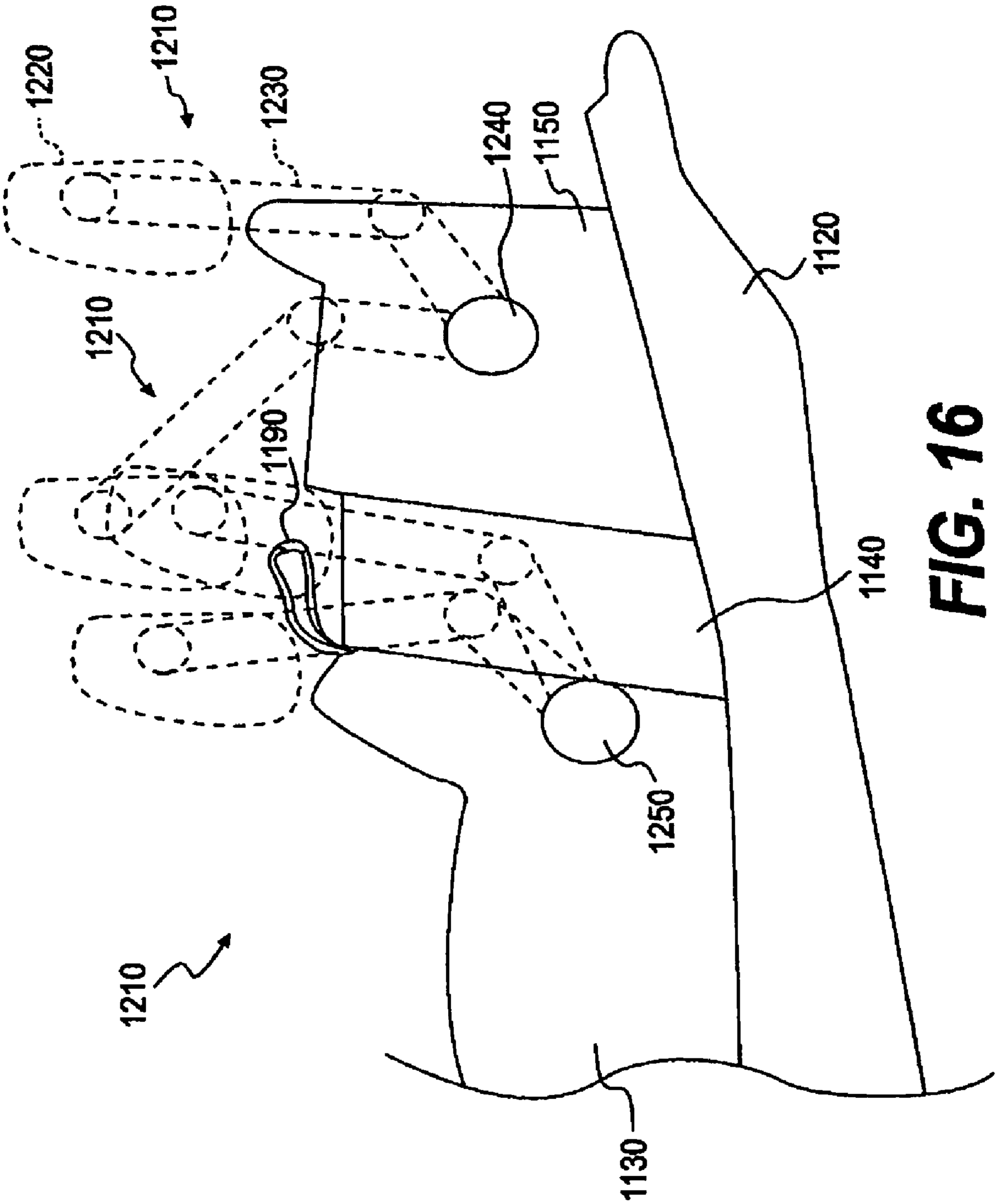


FIG. 16

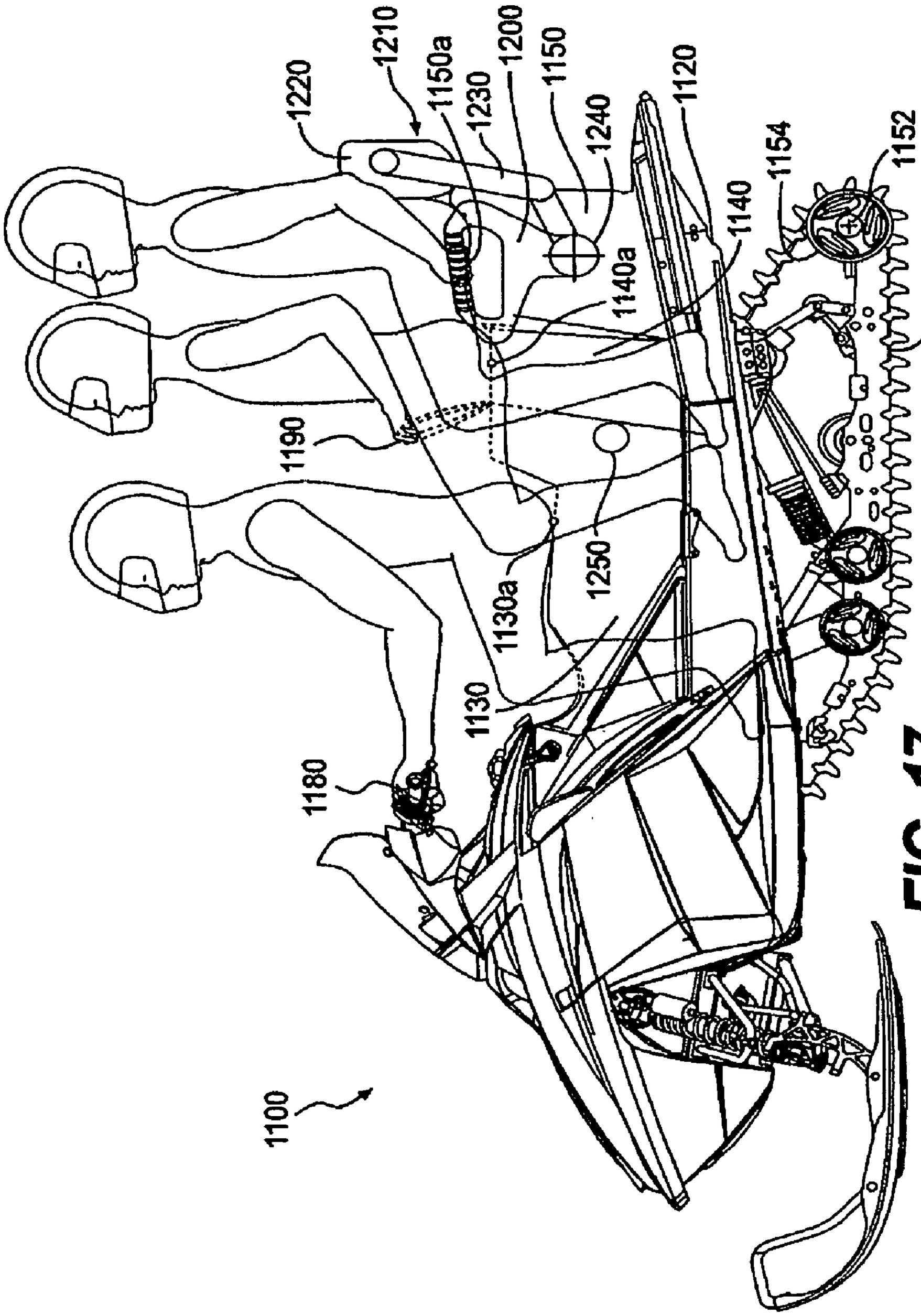

1220
1210
1150a
1230
1200
1150
1240
1120
1154
1152
1140
1140a
1156
1190
1250
1130a
1130
1180
1100

FIG. 17

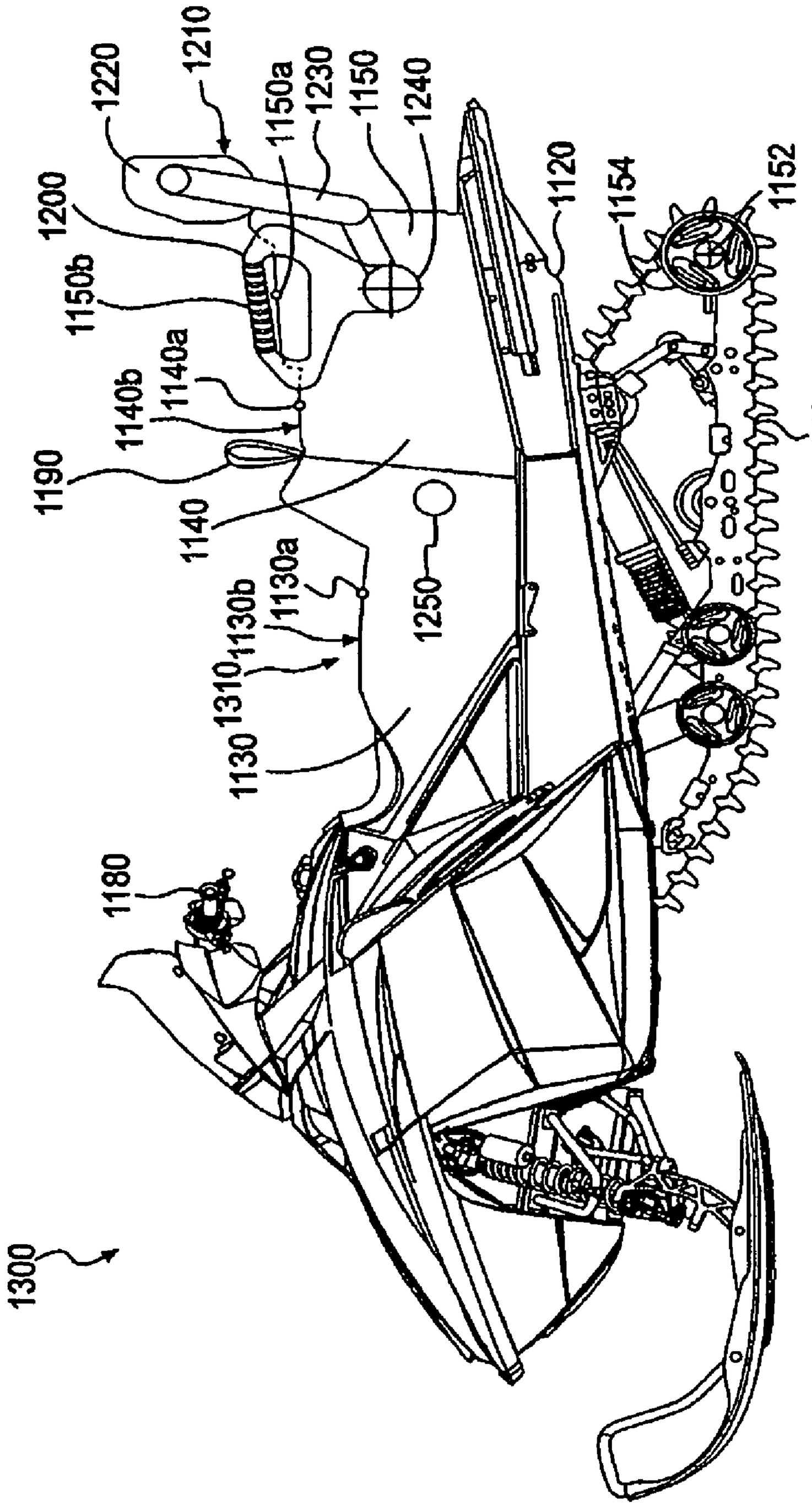

1210
1220
1150a
1230
1150
1240
1200
1120
1154
1152
1150b
1140a
1140b
1190
1140
1130a
1130b
1310
1130
1250
1180
1156
1300

FIG. 18

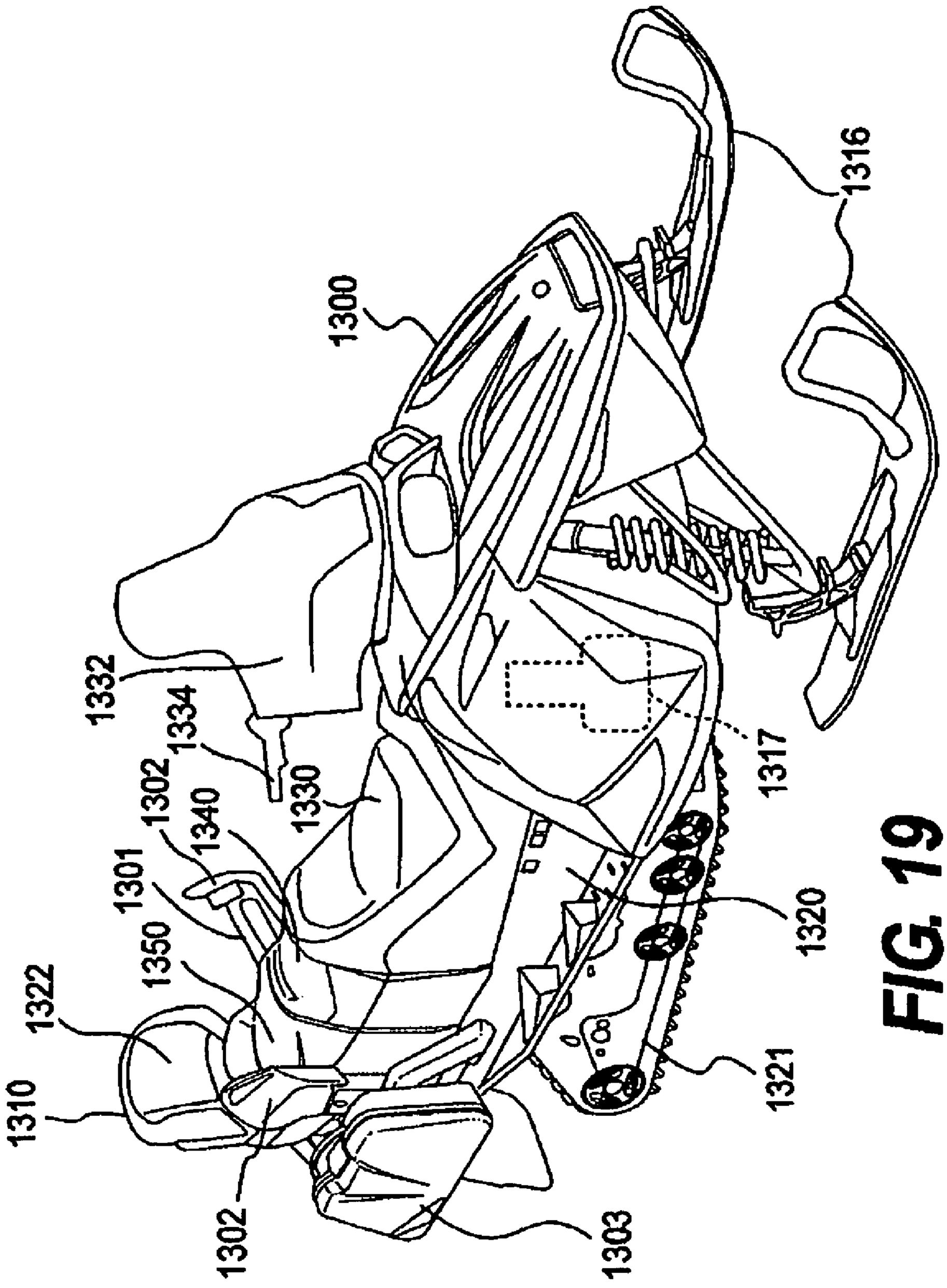

1316
1300
1332
1334
1302
1330
1340
1301
1350
1322
1310
1302
1303
1317
1320
1321

FIG. 19

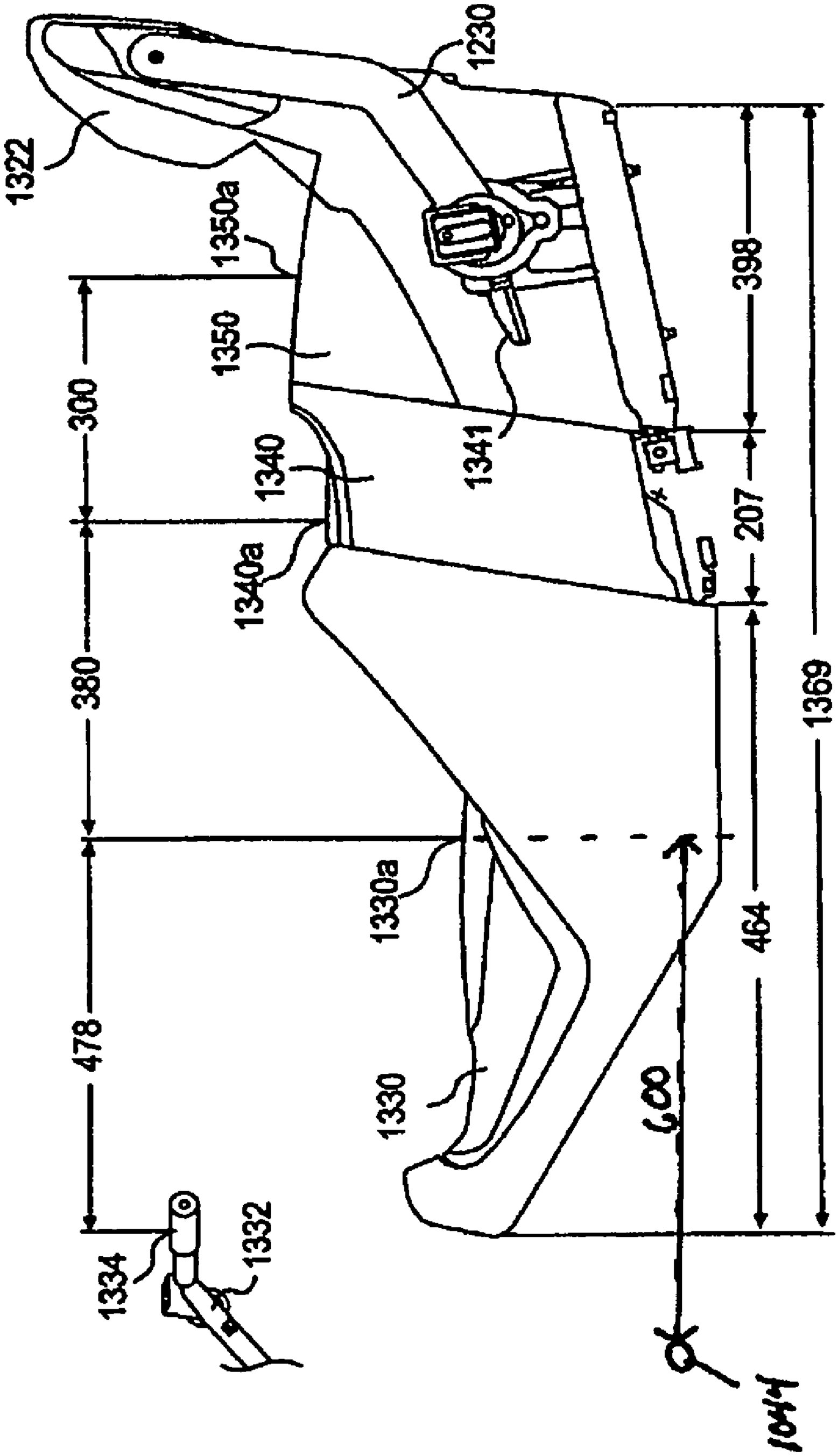

1230
1322
1350a
1350
300
1340
1340a
1341
398
207
380
1330a
1330
464
1369
478
1334
1332
600
1044

FIG. 20

THREE-SEAT SNOWMOBILE WITH MODULAR SEAT

This application is a continuation-in-part of U.S. patent application Ser. No. 11/040,112 filed on Jan. 24, 2005, now abandoned. The '112 application was a continuation of U.S. patent application Ser. No. 10/851,476 filed on May 22, 2004, now abandoned. Through the '476 application, this application claims the benefit of priority to U.S. patent application No. 60/472,733 filed on May 23, 2003. This application also claims the benefit of priority to U.S. patent application No. 60/654,383, filed Feb. 18, 2005. All of the aforementioned applications are incorporated herein by reference. This application also incorporates by reference the following U.S. patent applications, Ser. No. 09/877,188, filed on Jun. 11, 2001; Ser. No. 09/472,134, filed on Dec. 23, 1999; 60/167,614, filed on Nov. 26, 1999; and Canadian Patent Application No. 2,256,944, filed on Dec. 23, 1998.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to the overall design and construction of a snowmobile, and more particularly to a design of a snowmobile with a modular seat assembly.

2. Description of the Related Art

Conventional two-up snowmobiles share one of two common seat constructions: the seat is either formed as a one-piece structure having the driver and first passenger seating positions on a continuous surface, or, as is shown and described in U.S. Pat. No. 6,491,124, the first passenger seating position is situated on a removable seat portion placed behind a separate front seat portion including the driver seat position.

After-market removable first passenger seat portions are also available for one-up snowmobiles. Although one-up snowmobiles have no particular position to accept a removable first passenger seat portion, these after-market seats are simply strapped to the rear of the snowmobile in such a manner to allow the first passenger to safely sit behind the driver.

While the positioning of the driver and passenger on the conventional snowmobile is entirely adequate for enjoying the sport of snowmobiling, a desire has developed for a snowmobile that may comfortably accommodate two passengers in addition to the driver (3-up rider positioning). Consequently, a need as developed for a new and improved modular seat for snowmobiles which can be used in a one-up, two-up, and three-up configuration.

SUMMARY OF THE INVENTION

The present invention improves upon the conventional seat design by facilitating the addition of a third seat for a third rider, who experiences a reasonably comfortable ride.

One aspect of the present invention is to provide a snowmobile having a frame, an engine disposed on the frame in front of the seat; a drive track disposed below the frame and connected operatively to the engine for propulsion of the snowmobile; two skis disposed on the frame; a steering device; and a straddle seat assembly attached to the frame, the straddle seat assembly comprising a first seat portion for a driver, a second seat portion for a first passenger, the second seat portion being disposed behind the first seat portion, a third seat portion for a second passenger, the second and third seat portions being selectively detachable from the frame.

Another aspect of the present invention provides the snowmobile with a tunnel, the seat assembly being attached to the tunnel.

Yet another aspect of the present invention has the second seat portion and the third seat portion integral and only detachable from the frame as a unit.

Still another aspect of the invention has the first seat portion selectively detachable from the frame.

Another aspect of the present invention has a storage space created when one of the second and third seat portions are detached from the frame.

Yet another aspect of the present invention has the second and third seat portions separately detachable from the frame.

Still another aspect of the present invention has the third seat portion selectively releasably attached to the frame adjacent to the frame adjacent to and rearward of the first seat portion when the second seat portion has been detached from the frame.

Yet another aspect of the present invention has a storage space behind the third seat portion when the third seat portion is attached to the frame adjacent and rearward the first seat portion.

Still another aspect of the present invention includes a backrest mounted to the third seat portion.

Another aspect of the present invention has the backrest removable from the third seat portion.

Still another aspect of the present invention has the third seat portion constructed and arranged to be selectively releasably attachable to the frame adjacent to and rearward of the first seat portion and the second seat portion is constructed and arranged to be selectively releasable attachable to the frame adjacent to and rearward of the third seat portion, whereby the second seat portion and the third seat portion are interchangeable on the snowmobile.

Yet another aspect of the present invention has the seat portions comprise seat surfaces, the seat surfaces of the second and third seat portions are higher than the surface of the first seat portion.

Still another aspect of the present invention has the seat surface of the third seat portion higher than the seat surface of the second seat portion.

Yet another aspect of the present inventions provides the second seat portion selectively detachable from the frame.

Another aspect of the present invention has the second and third seat portions permanently attached to each other and are selectively detachable from the frame.

Yet another aspect of the present invention provides a backrest mounted to the third seat portion and the first seat portion, wherein the first seat portion further includes a backrest mounting pivot, and the backrest is removably mounted to the third seat portion and capable of being removably mounting to the backrest mounting pivot on the first seat portion.

Another aspect of the present invention is to have the first seat portion with a first seat surface, the second seat portion has a second seat surface that is higher than the first seat surface, and the third seat portion has a third seat surface that is higher than the first seat surface.

Yet another aspect of the present invention provides a snowmobile comprising a frame; an engine disposed on the frame in front of the seat; a drive track disposed below the frame and connected operatively to the engine for propulsion of the snowmobile; two skis disposed on the frame; a steering device disposed on the frame forward of the seat

assembly and operatively connected to the two skis for steering the snowmobile; and a straddle seat assembly attached to the frame, the straddle seat comprising a first seat portion for a driver, a second seat portion for a first passenger, and a third seat portion for a second passenger, each of the seat positions comprising a seat surface, the seat surface of the second seat position and the seat surface of the third seat position being higher than the seat surface of the first seat position.

Additional and/or alternative aspects, objects, and features of embodiments of the present invention will be made more apparent in the description that follows.

BRIEF DESCRIPTION OF THE DRAWINGS

Various exemplary embodiments of the present invention will be described with reference to the following drawings, wherein like reference numbers denote like features, in which:

FIG. **1** is a side view illustration of a conventional snowmobile;

FIG. **2** is a side view illustration of a snowmobile according to a first embodiment of the present invention;

FIG. **3** is a side view illustration of snowmobile according to a second embodiment of the present invention;

FIGS. **4**A and **4**B show side views of a snowmobile according to a third embodiment of the present invention;

FIG. **5** is a side view illustration of a snowmobile according to a fourth embodiment of the present invention;

FIGS. **6**A and **6**B show side view illustrations of a snowmobile according to a fifth embodiment of the present invention;

FIG. **7** is a side view illustration of a snowmobile according to a sixth embodiment of the present invention;

FIG. **8** is a table comparing various dimensions of conventional snowmobiles and snowmobiles according to the present invention;

FIGS. **9** and **10** show the dimensions of a standard rider;

FIGS. **11**A through **11**D show the operation of a cover according to either the third or fifth embodiment;

FIGS. **12**A through **12**E show alternative seat and support arrangements for either the third or fifth embodiment;

FIG. **13** is a side view of a three-person snowmobile according to a seventh embodiment of the present invention;

FIG. **13**A is a top view of the second seat with a portion of the seat cut away to illustrate internal components.

FIG. **13**B is a cross-section of the second seat along A-A shown in FIG. **13**A.

FIG. **13**C is a bottom view of the third seat portion.

FIG. **13**D is a side view of the third seat portion of FIG. **13**C.

FIG. **13**E is a top view of a portion of the rear of the tunnel including mounting pins.

FIG. **14** is a side view of the snowmobile illustrated in FIG. **13** in a two-person seat configuration;

FIG. **15** is a side view of the snowmobile illustrated in FIG. **13** in a one-person seat configuration;

FIG. **16** is a partial side view of the snowmobile illustrated in FIG. **13**;

FIG. **17** is a side view of the snowmobile illustrated in FIG. **13** with three riders thereon; and

FIG. **18** is a side view of a three-person snowmobile according to an eighth embodiment of the present invention.

FIG. **19** is the commercial embodiment of the snowmobile of the present invention.

FIG. **20** is a side view of the seat shown in FIG. **19** showing the dimensions of the various seat portions.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

Throughout the description of the various embodiments of the present invention, reference will be made to various elements, the construction of which is readily known to those skilled in the art. Accordingly, an exhaustive description of each and every component is not provided. Components that are similar to components in other embodiments will be referenced by identical reference characters but with different prefix digits.

To facilitate comparison of the present invention to the conventional snowmobile, several additional aspects of the conventional snowmobile **110** must be identified. As shown in FIG. **1**, the steering shaft **136** operatively connects the steering device **132** to the skis **116**. The steering device **132** has a steering position **134**, which is defined in the same manner as in the below embodiments. The driver (first rider) **26** has a center of gravity **127**, which is located slightly forward of his torso because his arms and legs extend forward of his body while riding the snowmobile **110**, and sits in a seat position **152**. Similarly, the first passenger (second rider) **28** has a center of gravity **129**, and sits in a seat position **154**. A combined center of gravity **170** of the snowmobile **110** and the first rider **26** is located behind the center of gravity **146** of the snowmobile **110** without riders. A combined center of gravity **172** of the snowmobile **110** and first and second riders **26**, **28** is located farther behind the center of gravity **146** of the snowmobile **110** without any riders.

FIG. **2** illustrates a first embodiment of the snowmobile **10**. The snowmobile **10** has a forward end **11** and a rearward end **13** that are defined consistently with the travel direction of the snowmobile **10**. The snowmobile **10** includes a body **12** (i.e., the exterior upper portions) and a frame **14**. A motor **17**, such as an internal combustion engine, is carried by the frame **14** at the forward end **11**. In addition, two skis **16** are attached to the forward end **11** of the frame **14** through a suspension system **18**. It should be noted, however, that a single centered ski would also work with the invention. A drive track **20** is disposed under frame **14** and is connected operatively to the engine **17** for propulsion of the snowmobile **10**.

At the front **11** of the frame **14**, the snowmobile **10** includes fairings **22** that enclose the engine **17** to protect it and to provide an external shell that can be decorated so that the snowmobile **10** is aesthetically pleasing. Typically, the fairings **22** comprise a hood and a bottom pad (neither of which have been individually identified in the drawing figures). A windshield (not shown) may be connected to fairings **22** near the forward end **11** of snowmobile **10** in front of a steering device **32** to lessen the force of the air on the first rider (driver) **26** when the snowmobile **10** is moving.

A straddle seat **50** is disposed on the frame **14** behind the engine **17**. The seat **50** has a first seat position **52**, which is defined as a portion of the seat **50** that is adapted to support a center of a weight distribution of the first rider **26** on the seat **50**. Because snowmobiles typically have elongated straddle seats and are adapted to permit riders to sit in a variety of front-back positions, numerous seat positions will exist on any straddle seat. The inventors of the present invention define the term "seat position" to point out particular positions on the snowmobile that are adapted to function as the seat position for a standard rider.

FIGS. **9** and **10** illustrate the various dimensions of a standard rider of the type depicted throughout the drawings. The standard rider is a 50^{th} percentile North-American adult

male. All lengths in FIGS. **9** and **10** are in centimeters. The middle of each set of three dimensions represents the standard rider. The standard rider weighs 78 kgs. and has the body build illustrated in FIGS. **9** and **10**. The dimensions of the standard rider are a "ruler" by which the dimensions of the various embodiments of the snowmobile of the present invention are measured. Riders **26**, **28**, **30** are standard riders.

The steering device **32**, such as a handlebar, is positioned at the forward end of the snowmobile **10** above the engine **17**. The steering device **32** has a steering position **34**, which is defined by a center of a portion of the steering device adapted to be held by the hands of the rider **26**. The steering position **34** is defined when the skis **16** are positioned straight-forward. For example, if the steering device **32** comprises handlebars (as illustrated in FIG. **2**), the steering position **34** is the center of the grips of the handlebars.

While the steering device **32** is shown in the various figures as a handlebar, the steering device **32** should not be limited to just this particular construction. It would be understood by those skilled in the art that any suitable steering device **32** may be used for the snowmobile **10**. For example, the steering device **32** could be a steering wheel or a yoke of the type used in aircraft. In accordance with the above definition of the steering position **34**, if the steering device **32** is a steering wheel or yoke, the steering position **34** is the center of the steering wheel or yoke.

Moreover, the positioning of the steering device **32** above the engine **17** also should not be considered to be limited to the position illustrated in FIG. **2**. As would be understood by those skilled in the art, depending on the particular arrangement of elements for the snowmobile **10**, it is possible that the steering device **32** could be positioned higher or lower than shown in FIG. **2** without departing from the scope and spirit of the present invention.

A steering shaft **36** operatively connects the steering device **32** to the two skis **16** and is disposed over the engine **17** at an angle ϵ from vertical. The inventors altered the positioning of the axis of the steering shaft **36** so that it is more steeply sloped than steering shafts **136** in prior art snowmobiles **110** having steering shafts over the engine. According to the present invention, and as illustrated in FIGS. **2** and **8**, the angle ϵ is less than 45°. More preferably, angle ϵ lies between about 25 and 40°. Even more preferably, angle ϵ lies between about 30 and 35°. Most preferably, angle ϵ is about 33°.

Because the steering device **32** is shifted forward, relative to the conventional snowmobile **110**, the steering position **34** is disposed in front of the center of gravity **46** by a distance B. According to the first embodiment of the present invention shown in FIG. **2**, distance B is greater than 0 and preferably between 105 mm and 155 mm.

A drive track **20**, which is operatively connected to the engine **17**, is positioned below the frame **14**. The drive track **20** is a continuous belt that runs around a number of axles including a forward-most axle **44**. The continuous belt has a 136-inch circumference in the first embodiment illustrated in FIG. **2**, though the invention is in no way limited to a snowmobile with a particular belt size. The forward-most drive axle **44** is disposed behind the steering position **34** by a distance calculated as distance B minus distance A. According to the present invention, the forward-most drive axle **44** is disposed behind the steering position **34**. Preferably, the distance is between 40 mm and 90 mm.

Two footrests are positioned on either side of seat **50** to accommodate the feet of the riders **26**, **28**. The footrests extend outwardly from the frame **14**. The footrests may be disposed in a horizontal orientation, or alternatively, in an angled orientation.

An adjustable backrest **92** is attached to the seat **50** near the back end of the seat **50**. Various embodiments of the backrest **92** are described throughout the specification, where preferred. As would be understood by those skilled in the art, the backrest **92** need not have only the construction shown or be located in the position depicted. In fact, the backrest **92** need not be provided at all.

The first seat position **52** is located behind the forward-most drive axle **44** by a horizontal distance calculated as distance D plus distance A. According to the present invention, this distance is less than 590 mm and preferably between 540 mm and 590 mm.

A second seat position **54** is disposed on the seat **50** behind the first seat position **52** and is adapted to accommodate a second rider **28** (first passenger) behind the driver **26** (first rider). As the rider **26** is positioned closer to the center of gravity **46** of the snowmobile **10** than on a conventional snowmobile **110**, the ride for the second rider **28** on the snowmobile **10** is improved because the second rider **28** is also disposed closer to the center of gravity **46** of the snowmobile **10** (by comparison with a second rider **28** on a conventional snowmobile **110**). The second seat position **54** is disposed a distance F behind the first seat position **52**. According to this embodiment, distance F is between 315 mm and 365 mm. Preferably, distance F is between 325 mm and 355 mm.

In this embodiment, the first and second seat positions **52**, **54** are disposed on the seat **50**, which comprises an integral seat unit. The integral seat unit **50** may be rigidly mounted to the snowmobile **10** or it may be removably mounted.

A center of gravity **70** of the combined weight of the snowmobile **10** and rider **26** is disposed behind the center of gravity **46** of the snowmobile **10** without a rider. A center of gravity **72** of the combined weight of the snowmobile **10** and two riders **26**, **28** is disposed farther rearward of the center of gravity **46**. The first rider **26** has a center of gravity **27**, which is positioned slightly forward of the rider's **26** torso because the rider's arms and legs are in a forwardly-extending position. Similarly, the second rider **28** has a center of gravity **29**.

The center of gravity **29** of a second rider **28** on the snowmobile **10** is disposed behind the center of gravity **46** of the snowmobile **10** by a distance calculated as distance C plus distance E. This distance is preferably between 695 mm and 745 mm.

FIG. **5** illustrates a second embodiment of the present invention. Like the snowmobile **10** of the first embodiment, the snowmobile **410** has a long frame **414** and a 136 inch drive track **20**.

As with the first embodiment, the axis of the steering shaft **36** forms an angle ϵ with vertical that is less than 45 degrees. Similarly, the angular position of steering shaft **36** permits placement of steering position **34** in a position forward of that for the conventional snowmobile **110**, which moves the positions of the riders **26**, **28** closer to the center of gravity **446** of the snowmobile **410** and improves the comfort of the riders **26**, **28**.

The forward-most drive axle **444** is disposed behind the steering position **34** by a distance calculated as distance B minus distance A. According to the present invention, the forward-most drive axle **444** is disposed behind the steering position **34**. Preferably, the distance is between 40 mm and 90 mm.

Like the seat **50** of the first embodiment, the seat **450** of snowmobile **410** comprises an integral seat unit that may either be rigidly mounted to the snowmobile **410** or removable. A first seat position **452** is defined on the seat **450** behind the forward-most drive axle **444** by a horizontal distance calculated as distance D plus distance A. According to the present invention, this distance is less than 590 mm and preferably between 540 mm and 590 mm.

A second seat position **454** is disposed on the seat **450** a horizontal distance F behind the first seat position **452**. According to this embodiment, distance F is between 315 mm and 365 mm.

A third seat position **456** is added behind the second seat position **454** on the seat **450** in order to accommodate a third rider **30**. The forward placement of the steering position **34** permits a third rider **30** to ride the snowmobile **410** without experiencing prohibitively large jostling forces. The center of gravity **431** of the third rider **30** is positioned behind the center of gravity of snowmobile **410** by a distance calculated as distance C plus distance E plus distance **0**, which is preferably between 900 mm and 950 mm.

A center of gravity **470** of the combined weight of the snowmobile **410** and rider **26** is disposed behind the center of gravity **446** of the snowmobile **410** without a rider. A center of gravity **472** of the combined weight of the snowmobile **410** and two riders **26**, **28** is disposed farther rearward of the center of gravity **446** of the riderless snowmobile **410**. A center of gravity **474** of the combined weight of the snowmobile **410** and three riders **26**, **28**, **30** is disposed even farther rearward of the center of gravity **446** of the riderless snowmobile **410**. The first rider **26** has a center of gravity **427**, which is positioned slightly forward of the rider's **26** torso because the rider's arms and legs are in a forwardly-extending position. Similarly, the second and third riders **28**, **30** have centers of gravity **429**, **431**, respectively.

The center of gravity **427** of the first rider **26** on the snowmobile **410** is preferably between 220 mm and 270 mm behind the center of gravity **446** of the snowmobile **410**.

The center of gravity **429** of a second rider **28** on the snowmobile **410** is disposed behind the center of gravity **446** of the snowmobile **410** by a distance calculated as distance C plus distance E. This distance is preferably between 590 mm and 640 mm.

The center of gravity **431** of the third rider **30** on the snowmobile **410** is disposed behind the center of gravity **446** of the snowmobile **410** by a distance calculated as distance C plus distance E plus distance G. This distance is preferably between 900 mm and 950 mm.

A horizontal distance H between the second seat position **454** the third seat position **456** is preferably between 285 mm and 335 mm. A horizontal distance G between the center of gravity **429** of the second rider **428** and the center of gravity **431** of the third rider **430** is about the same as distance H for this embodiment

FIGS. **13-17** illustrate an additional alternative embodiment of the present invention Like the snowmobile **410** illustrated in FIG. **5**, the snowmobile **1100** is designed to accommodate up to three riders (a driver and first and second passengers). Accordingly, a three-person straddle seat assembly **1110** is mounted to a frame **1120** of the snowmobile **1100**.

FIGS. **13** and **17** illustrate a first configuration of the seat assembly **1110**, which is specifically designed to accommodate 3 riders. The straddle seat assembly **1110** comprises distinct first, second, and third seat portions **1130**, **1140**, **1150** for the driver, first passenger, and second passenger, respectively. The seat portions **1130**, **1140**, **1150** define seat positions **1130***a*, **1140***a*, **1150***a*, respectively for the driver and the two passengers.

The seat position **1150***a* of the second passenger Is disposed forward of an axis **1152** of a rear idler wheel **1154** of an endless track **1156** of the snowmobile **1100**. By placing the seat position **1150***a* forward of the rear idler wheel **1154**, the skis of the snowmobile **1100** and the second passenger are disposed on the same side of the "see-saw" fulcrum created by the rear idler wheel **1154** so that the second passenger's weight does not lift the steering skis or impair the steerability of the snowmobile **1100**. In conventional snowmobiles, on the other band, if a third rider attempts to squeeze onto a snowmobile, his weight would be positioned behind the rear idler wheel and, disadvantageously, would tend to lift the skis from the ground or reduce the steering force applied by the skis due to the fact conventional snowmobiles were not designed to carry three riders.

Second seat portion **1140** is shown in greater detail in FIGS. **13**A and **13**B. Seat portion **1140** comprises a base **1141**, preferably made from plastic or light weight metal and foam **1143** placed on top of the base **1141**. The top portion of foam **1143** defines seat position **1140***a* where a rider will be seated. A flexible, preferably waterproof cover will cover the foam **1143** and attach to the base **1141** to hold the foam and base together as a single unit. Base **1141** further includes tongues **1142** extending forwardly from the front of the base **1141**. Tongues **1142** are used to secure seat **1140** to the first seat portion **1130** as will be described in greater detail below. Base **1141** also includes cavities **1146** situated toward the rear of the base **1141**. Cavities **1146** serve to accept tongues **1152** of seat **1150** shown in FIGS. **13**C and **13**D. In the preferred embodiment, two cavities are used to accept two tongues of the seat placed behind it, it will be appreciated that one or more than two tongues and cavities could be used.

Best seen in FIG. **13**E the tunnel **1120** has two holders **1162**, one on the right-hand side of the tunnel and one on the left-hand side of the tunnel, to accept tongues **1142** and/or **1152** of the second and third seat portions **1140** and/or **1150** respectively. The two forward-most holders **1162** are preferably situated on the tunnel **1120** such that they coincide with the rear bottom corners of the first seat portion **1130** and second seat portion **1140** best shown in FIG. **13**. When the second seat portion **1140** is to be attached to the snowmobile **1100**, the bottom surface **1145** of second seat portion **1140** is placed on top of frame/tunnel **1120** such that the tongues **1142** are aligned with the two forward-most holders **1162**. The seat **1140** is then pushed forward until surface **1144** of the second seat portion **1140** contacts the first seat portion **1130**. The bottom surface **1145** of the second seat portion **1140** further includes cavities **1146** which accept the rear-most holders **1162** and permit the second seat portion **1140** to lie flat onto the tunnel **1120**. In order to prevent the second seat portion from moving rearward relative to the first seat portion, a third seat portion **1150** is attached to top of the tunnel **1120** behind the second seat portion **1140** as will be described in greater detail below.

Also shown in FIG. **13**E are pins **1164** which are used to attach the third seat portion **1150** to the tunnel **1120** in a manner described below. The preferred embodiment uses two laterally spaced pins to attach the seat in each of the two positions, i.e. when the third seat portion **1150** is placed directly behind the first seat portion **1130**, the two forward-most pins **1164** are used, when the third seat portion **1150** is placed behind the second seat portion **1140**, which is itself placed behind the first seat portion **1130**, the two rear-most

pins **1164** are used. It would be appreciated that one or more than two pins could be used to secure the seat portion to the tunnel. The pins **1164** have a circular shaft (not shown) with an enlarged head portion **1166**. The pins **1164** are preferably placed in indentations **1168** within the tunnel **1120** such that the enlarged heads **1166** do not protrude beyond the upper surface of the tunnel and interfere with any cargo placed in that area when the seat portions are not being used. A cargo rack **1170** is also placed on the tunnel **1120** to prevent cargo from falling off the tunnel **1120**. The cargo rack **1170** could also be used to support additional accessories or the passenger hand grips **1200** such as is shown in FIG. **14**.

FIGS. **13**C and **13**D illustrate further aspects of the third seat portion **1150**. Third seat portion **1150** comprises a base **1153**, preferably made of plastic or a lightweight metal, and foam **1154** placed above the base **1153**. A flexible, preferably waterproof cover will cover the foam **1154** and attach to the base **1153** to hold the foam and base as a single unit. The top surface of foam **1154** defines the seating surface **1150***b*. As discussed above, third seat portion **1150** also includes two tongues **1152** extending forwardly from the base **1153**. Base **1153** further includes two apertures **1154** toward the rear bottom corners of the base **1153** as can be seen in FIGS. **13**C and **13**D. Apertures **1154** are provided to accept mounting pins **1164** shown in FIG. **13**E.

Base **1153** also includes a latch mechanism for holding and releasing the third seat portion **1150** to the tunnel **1120**. The latch mechanism uses a strap **1155**, extending from the rear of the seat **1150** and connected to a piece of wire **1156**, which, when the seat is installed onto the tunnel **1120**, engages the enlarged portions **1166** of the mounting pins **1164** preventing the seat from being pulled away from the tunnel **1120**. Wire **1156** is shaped such that it passed through at least a portion of the aperture **1154**. When strap **1155** is pulled, the wire is flexed away from the aperture **1154**, disengaging the pins **1164** and allowing the seat to be removed from the tunnel.

It is to be understood, that, in order to install the third seat portion **1150** to the top of the tunnel **1120** behind the second seat portion **1140**, or behind the first seat portion **1130**, one would slightly tip the seat toward the front, insert the tongues **1152** into cavities **1162** and proceed to push the rear of the seat toward the tunnel until pins **1164** are inserted into apertures **1154** and wire **1156** has flexed and passed over the enlarged top portion **1166** of the pins **1164** securing the seat to the tunnel **1120**. The second seat portion **1140**, when in used, relies on its tongues **1142** inserted into the two forward-most cavities **1162** and the tight fit with between the first seat portion and the third seat portion to keep it in place. As would be appreciated by one skilled in the art, a similar attachment system including the pins and flexible wire explained for the third seat portion **1150** could be used to attach the second seat portion **1140** to the tunnel **1120** without deviating from the present invention.

In the preferred embodiment, the second seat portion **1140** can only be installed if the third seat portion **1150** has been removed from the tunnel **1120**. It is contemplated that the second seat portion, without the tongues **1142**, could be used and simply inserted between the first seat portion **1130** and the third seat portion **1150** (also without tongues **1152**) and rely on a tight fit between the two seats to prevent the second seat portion **1140** from being inadvertently removed from the tunnel **1120**.

Base **1153** of the third seat portion **1150** further includes rubber bumpers **1157**. Bumpers **1157** make contact with the top surface of the tunnel **1120** when the third seat portion **1150** is attached to the tunnel **1120**. Bumpers **1157** are sized such that they are compressed between the seat and the tunnel once the seat is installed onto the tunnel, thus pushing the seat vertically away from the tunnel creating constant contact between the wire **1156** and the enlarged portion **1166** of pins **1164**, eliminating any small vertical movements between the seat and the tunnel when the rider is not seated on the seat. It would be understood that the force created by the bumpers **1157** would be insufficient to cause the wire **1156** to disengage the enlarged portions **1166** such that the third seat portion is inadvertently forced away from the tunnel.

To facilitate comfortable seating of all three riders, a surface **1130***b* of a seat defined by the first seat portion **1130** is preferably disposed below a surface **1140***b* of a seat defined by the second seat portion **1140**. The surface **1140***b* is preferably disposed below or at the same height as a surface **1150***b* of a seat of the third seat portion **1150**.

FIG. **14** illustrates a second configuration of the seat assembly **1110**, which is designed to accommodate 2 riders, (a driver and one passenger). As may be appreciated from the discussion that follows, the second configuration of the seat assembly **1110** presents a variation on the configuration depicted in FIG. **13**.

So that these two configurations are possible, each seat portion **1130**, **1140**, **1150** is individually mounted to the frame **1120**. The first seat portion **1130** is mounted to the frame **1120**. The second seat portion **1140** is selectively detachable from the frame **1120**. The third seat portion **1150** is movably attached to the frame **1120** for selective positioning in a rearward position (see FIG. **13**) and a forward position (see FIG. **14**). Accordingly, when the second seat portion **1140** is detached from the snowmobile **1100**, the third seat portion **1150** may be selectively moved forward to abut against the first seat portion **1130**. In this second seat assembly **1110** configuration, the driver is supported by the first seat portion **1130** and a first passenger is supported by the third seat portion **1150**. For this configuration, a storage space **1160** is provided behind the third seat portion **1150** and above the frame **1120** in the space created by moving the third seat portion **1150** forward.

FIG. **15** illustrates a third seat assembly **1110** configuration which is designed to accommodate one rider. In addition to being movably attached to the frame **1120**, the third seat portion **1150** is also detachably mounted to the frame **1120**. Accordingly, when both the second and third seat portions **1140**, **1150** are detached, the seat assembly **1100** provides support for one rider via the first seat portion **1130**. A large storage space **1170** is provided behind the first seat portion and above the frame **1120** in the space that is no longer occupied by the second and third seat portions **1140**, **1150**.

FIG. **13**D also shows backrest assembly **1210** mounted to the third seat portion **1150** through the mounting points **1240**. Mounting points **1240** allow the backrest assembly **1210** to pivot with respect to the third seat portion **1150** in the direction of the arrows. A lever, **1241**, when rotated counterclockwise, engages a release mechanism (not shown) which allows the spring to bias the backrest **1220** toward the front. When lever **1241** is rotated clockwise, the release mechanism prevents further movement of the backrest **1220** relative to the third seat portion **1150**. This allows the passenger to adjust the positioning of the backrest **1220** to a comfortable position. Lever **1241** may also be spring biased to a position which prevents the backrest **1220** from any movement with respect to the third seat portion **1150**.

As illustrated in FIGS. **13**, **13**D, and **14**, a backrest assembly **1210** mounts to the third seat portion **1150**. The backrest assembly **1210** includes a cushioned backrest **1220**

connected to an adjustable backrest mount **1230**. The third seat portion **1150** includes backrest mounting points **1240** on its left and right sides. The backrest mount **1230** has left and right arms that extend downwardly from the cushioned backrest **1220** and are constructed and arranged to adjustably and detachably mount to the backrest mounting points **1240** of the third seat portion **1150**. As illustrated in FIG. **16**, the backrest mount **1230** selectively pivotally connects to the mounting points **1240** to enable the position of the backrest **1220** to be adjusted. The backrest mount **1230** may include one or more internal backrest **1220** adjustment mechanisms, e.g., pivotal connections, telescopic connections, etc. The backrest assembly **1210** can therefore be adjusted for use by the first or second passenger.

While only the extreme positions of the backrest assembly **1210** are illustrated, the backrest assembly **1210** is preferably selectively positionable in a variety of intermediate and more extreme positions. For example, as illustrated in dotted lines in FIG. **13**, the backrest assembly **1210** may be attached to the third seat portion **1150** and pivoted forward enough that the driver may use the backrest **1220** for back support. Similarly, as illustrated in dotted lines in FIG. **14**, when the second seat portion **1140** is removed, the backrest assembly **1210** may also be adjusted to provide back support for the driver sitting on the first seat portion **1130**.

As illustrated in FIGS. **13**, **15**, and **16**, the first seat portion **1130** also has left and right backrest mounting points **1250**. As illustrated in FIG. **15**, when the third seat portion **1150** is not used, the backrest assembly **1210** may be detached from the mounting points **1240** and attached to the mounting points **1250** so that the back rest **1220** may be used by the driver. As illustrated in FIG. **16**, when attached to the mounting points **1250**, the backrest assembly **1210** may also be pivoted rearwardly enough to provide back support to a first passenger. Also illustrated in FIG. **16**, backrest assembly **1250** selectively pivotally connects to the backrest mounting points **1260** on the second seat portion **1140**.

Although the second and third seat portions **1140**, **1150** in this embodiment are independently detachable from the frame, various other seat assembly configurations are within the scope of the present invention. For example, all three seat portions **1130**, **1140**, **1150** could be integrally formed or permanently attached to each other. Such a combination of seat portions **1130**, **1140**, **1150** could be permanently attached to the frame or removably attached to the frame. Alternatively, the first and second seat portions **1130**, **1140** could be integrally formed with each other such that just the third seat portion **1150** would be detachable.

As illustrated in FIGS. **13** and **17**, various hand holds are preferably provided on the seat assembly **1110** to help the riders secure themselves in their positions on the snowmobile **1100**. The driver remains secure on the seat assembly **1110** because he holds the steering device **1180** (such as handlebars) with his/her hands.

The first passenger holds onto a looped strap **1190** that is mounted to the second seat portion **1140**. When the first passenger rests on the second seat portion **1140**, the looped strap **1190** is disposed between his/her legs and is positioned to enable the first passenger to hold onto the looped strap **1190** with his/her hands. In the illustrated embodiment, the looped strap **1190** comprises a looped piece of fabric webbing. However, various other types of hand holds could alternatively be provided for the first passenger. For example, flexible rubber or plastic handles could be mounted to the forward middle portion of the second seat portion **1140**. Alternatively, grab handle(s) could be formed in the second seat portion **1140**. Hand holds for the first passenger could alternatively be attached to or formed in a back end of the first seat portion **1130**.

Since the looped strap **1190** is mounted on the second seat portion **1140**, detachment of the second seat portion **1140** from the snowmobile **1100** also detaches he looped strap **1190** from the snowmobile **1100**. Of course, in the alternative, the looped strap **1190** could be attached to the rear of the first seat portion **1130** without deviating from the scope of the present invention.

In the embodiment illustrated in FIG. **17**, left and right grab handles **1200** (only the left grab handle is shown) mount to the left and right sides of the third seat portion **1150**. The grab handles **1200** extend upwardly above the surface **1150***b* of the seat of the third seat portion **1150** to enable the second passenger to easily grab the handles **1200** with his/her hands without having to strain his/her arms. The grab handles preferably comprise blow-molded plastic or rubber that is relatively flexible. Such grab handles are preferably of the type described in U.S. patent application Ser. No. 10/361,682, filed Feb. 11, 2003, titled "QUICK RELEASE PASSENGER SEAT WITH FLEXIBLE GRAB HANDLE", which is incorporated by reference herein in its entirety. In the alternative, as would be appreciated by those skilled in the art, the grab handles **1200** may not be attached to the third seat portion **1150**. Alternatively, a strap, such as the looped strap **1190**, may be attached thereto.

FIG. **18** illustrates yet another alternative embodiment of a snowmobile according to the present invention. The snowmobile **1300** is identical to the snowmobile **1100** illustrated in FIG. **13** except for an alternative seat assembly **1310**. The seat assembly **1310** is identical to the seat assembly **1110** illustrated in FIG. **13** except that the second and third seat portions **1140**, **1150** are integrally formed with (or otherwise permanently attached to) each other. The second and third seat portions **1140**, **1150** can therefore be simultaneously detached from frame **1120** to create a storage space behind the first seat portion **1130**. To use the seat assembly **1310** in a two rider configuration, the combined second and third seat portions **1140**, **1150** are removed and a separate additional third seat portion **1150** is attached to the frame **1120** behind the first seat portion (see FIG. **14**).

FIG. **19** shows a commercial embodiment of the present invention. Snowmobile **1300** is very similar to snowmobile **1100** shown in FIG. **14**. Snowmobile **1300** has a frame **1320**, an engine **1317** disposed on the frame **1320**, a drive track **1321** disposed below the frame **1320** and operatively connected to the engine **1317**. A straddle seat assembly **1310** is disposed on the flame **1320** rearward of the engine **1317** and two front skis **1316** are disposed forward of the engine **1317**. Handlebars **1332** are operatively connect to the two front skis **1316** for steering the snowmobile **1300**.

The straddle seat assembly **1310** is very similar to that of seat assembly **1110** shown in FIGS. **13-18** in that it comprises a first seat portion **1330**, a second seat portion **1340** and a third seat portion **1350**. Seat assembly **1310** also includes a back rest **1320** pivotally connected to the third seat portion **1350**. Backrest **1322** pivotally connects to the third seat portion **1350** in the same manner as described above with respect to backrest **1220** and third seat portion **1150**. Backrest **1322** is spring biased (not shown) toward the front of the seat as described above with respect to backrest **1220**. Also shown in FIG. **19**, handgrips **1301** and wind deflectors **1302** are provided on left and right sides of the third seat portion **1350**. Cargo boxes **1303** may also be attached to the right and left sides of the third seat portion **1350** to provide extra storage space when travelling with all three seat portions.

FIG. **20** shows the preferred dimensions of the first, second and third seat portions **1330**, **1340**, and **1350** respectively. First seat portion **1330** is approximately 764 mm+/−50 mm in length. The second seat portion is approximately 207 mm+/−50 mm in length and the third seat portion is approximately 398 mm in length. The first seating portion has a first seating position **1330***a*, which is approximately 478 mm+/−50 mm from the steering position **1334** and approximately 600 mm+/−50 mm from the front drive axle **1044**. The second seat portion has a second seating position **1340***a* which is approximately 380 mm+/−50 mm behind the first seating position **1330***a* and the third seat portion **1350** has a third seat position **1350***a* which is approximately 300 mm+/−50 mm behind the second seating position **1340***a*. The total length of the seat assembly **1310** comprising first, second and third seat portions **1330**, **1340**, and **1350** is 1369 mm+/−150 mm.

While the invention has been described with reference to the various exemplary embodiments outlined above, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the spirit and scope of the present invention. In addition, many modifications may be made to adapt a particular situation, component, or material to the teachings of the present invention without departing from its teachings as claimed.

What is claimed is:

1. A snowmobile comprising:

a frame;

an engine disposed on the frame;

a drive track disposed below the frame and operatively connected to the engine for propulsion of the snowmobile;

a straddle seat assembly attached to the frame rearward of the engine, the straddle seat assembly comprising

a first seat portion having a first seat surface for a driver, the first seat surface being generally horizontal;

a second seat portion disposed rearwardly of the first seat portion, the second seat portion having a second seat surface for a first passenger, the second seat surface being generally horizontal;

a third seat portion disposed rearwardly of the second seat portion, the third seat portion having a third seat surface for a second passenger, the third seat surface being generally horizontal;

a first intermediate surface disposed on one of the first seat portion and the second seat portion, the first intermediate surface being disposed rearwardly of the first seat surface and forwardly of the second seat surface, the first intermediate surface being inclined with respect to the first seat surface;

a second intermediate surface disposed on one of the second seat portion and the third seat portion, the second intermediate surface being disposed rearwardly of the second seat surface and forwardly of the third seat surface, the second intermediate surface being inclined with respect to the second seat surface;

the second seat portion and the third seat portion being selectively detachable from the frame;

two skis disposed on the frame; and

a steering device disposed on the frame forward of the straddle seat assembly and operatively connected to the two skis for steering the snowmobile.

2. The snowmobile of claim **1**, wherein the frame comprises a tunnel and the straddle seat assembly is attached to the tunnel.

3. The snowmobile of claim **2**, wherein the second seat portion and the third seat portion are integral and only detachable from the frame as a unit.

4. The snowmobile of claim **3**, wherein the first seat portion is selectively detachable from the frame.

5. The snowmobile of claim **3**, wherein a storage space is created when the second seat portion and the third seat portion are detached from the frame.

6. The snowmobile of claim **2**, wherein the second seat portion and the third seat portion are separately selectively detachable from the frame.

7. The snowmobile of claim **6**, wherein a storage space is created when at least one of the second seat portion and the third seat portion are detached from the frame.

8. The snowmobile of claim **6**, wherein the third seat portion is constructed and arranged to be selectively releasably attachable to the frame adjacent to and rearward of the first seat portion when the second seat portion has been detached from the frame.

9. The snowmobile of claim **8**, wherein when the third seat portion is attached to the frame adjacent to and rearward of the first seat portion, the snowmobile further comprises a storage space rearward of the third seat portion.

10. The snowmobile of claim **8**, further comprising a backrest mounted to the third seat portion.

11. The snowmobile of claim **10**, wherein the backrest is movably mounted to the third seat portion.

12. The snowmobile of claim **6**, wherein, the third seat portion is constructed and arranged to be selectively releasably attachable to the frame adjacent to and rearward of the first seat portion and the second seat portion is constructed and arranged to be selectively releasable attachable to the frame adjacent to and rearward of the third seat portion, whereby the second seat portion and the third seat portion are interchangeable on the snowmobile.

13. The snowmobile of claim **3**, wherein the second seat surface and the third seat surface are higher than the first seat surface.

14. The snowmobile of claim **13**, wherein the third seat surface is higher than the second seat surface.

15. A snowmobile comprising:

a frame;

an engine disposed on the frame; a drive track disposed below the frame and operatively connected to the engine for propulsion of the snowmobile;

a straddle seat assembly attached to the frame rearward of the engine, the straddle seat comprising

a first seat portion having a first seat surface for a driver, the first seat surface being generally horizontal;

a second seat portion disposed rearwardly of the first seat portion, the second seat portion having a second seat surface for a first passenger, the second seat surface being generally horizontal;

a third seat portion disposed rearwardly of the second seat portion, the third seat portion having a third seat surface for a second passenger, the third seat surface being generally horizontal;

a first intermediate surface disposed on one of the first seat portion and the second seat portion, the first intermediate surface being disposed rearwardly of the first seat surface and forwardly of the second seat surface, the first intermediate surface being inclined with respect to the first seat surface;

a second intermediate surface disposed on one of the second seat portion and the third seat portion, the second intermediate surface being disposed rearwardly of the second seat surface and forwardly of the third seat surface, the second intermediate surface being inclined with respect to the second seat surface;

the second seat surface and the third seat surface being higher than the first seat surface;

two skis disposed on the frame; and

a steering device disposed on the frame forward of the seat assembly and operatively connected to the two skis for steering the snowmobile.

16. The snowmobile of claim **15**, wherein the third seat surface is higher than the second seat surface.

17. A snowmobile comprising:

a frame having a tunnel;

an engine disposed on the frame;

a drive track disposed below the frame and operatively connected to the engine for propulsion of the snowmobile;

a straddle seat assembly attached to the tunnel rearward of the engine, the straddle seat assembly comprising

a first seat portion for a driver,

a second seat portion for a first passenger,

a third seat portion for a second passenger, and

a backrest mounted to the third seat portion,

the second seat portion and the third seat portion being separately selectively detachable from the frame;

the third seat portion being constructed and arranged to be selectively releasably attachable to the frame adjacent to and rearward of the first seat portion when the second seat portion has been detached from the frame;

two skis disposed on the frame; and

a steering device disposed on the frame forward of the straddle seat assembly and operatively connected to the two skis for steering the snowmobile.

18. The snowmobile of claim **17**, wherein the backrest is movably mounted to the third seat portion.

* * * * *